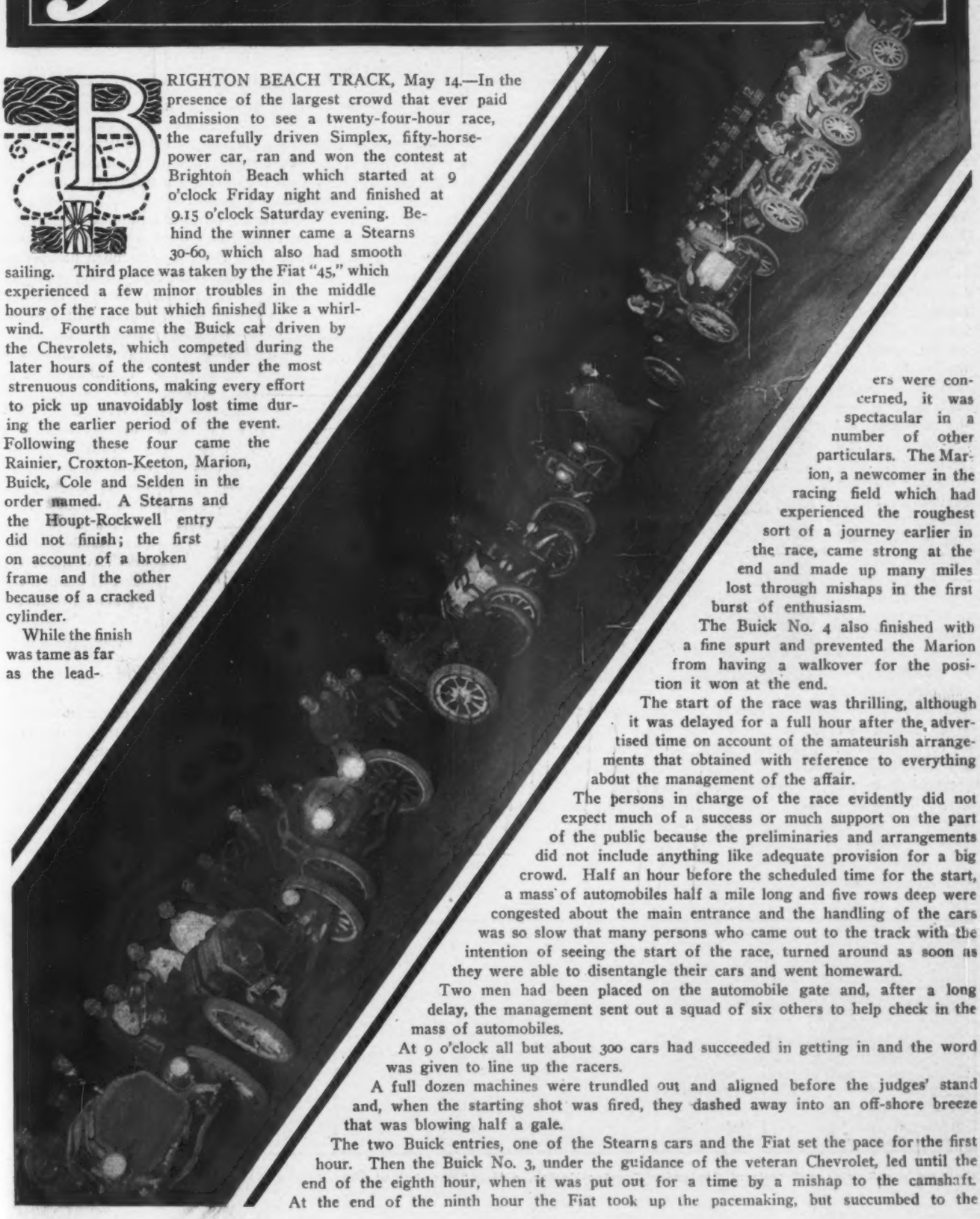
VOL. XXII NEW YORK—THURSDAY, MAY 19, 1910—CHICAGO No. 20

THE AUTOMOBILE

BRIGHTON BEACH TRACK, May 14.—In the presence of the largest crowd that ever paid admission to see a twenty-four-hour race, the carefully driven Simplex, fifty-horse-power car, ran and won the contest at Brighton Beach which started at 9 o'clock Friday night and finished at 9.15 o'clock Saturday evening. Behind the winner came a Stearns 30-60, which also had smooth sailing. Third place was taken by the Fiat "45," which experienced a few minor troubles in the middle hours of the race but which finished like a whirlwind. Fourth came the Buick car driven by the Chevrolets, which competed during the later hours of the contest under the most strenuous conditions, making every effort to pick up unavoidably lost time during the earlier period of the event. Following these four came the Rainier, Croxton-Keeton, Marion, Buick, Cole and Selden in the order named. A Stearns and the Houpt-Rockwell entry did not finish; the first on account of a broken frame and the other because of a cracked cylinder.



While the finish was tame as far as the leaders were concerned, it was spectacular in a number of other particulars. The Marion, a newcomer in the racing field which had experienced the roughest sort of a journey earlier in the race, came strong at the end and made up many miles lost through mishaps in the first burst of enthusiasm.

The Buick No. 4 also finished with a fine spurt and prevented the Marion from having a walkover for the position it won at the end.

The start of the race was thrilling, although it was delayed for a full hour after the advertised time on account of the amateurish arrangements that obtained with reference to everything about the management of the affair.

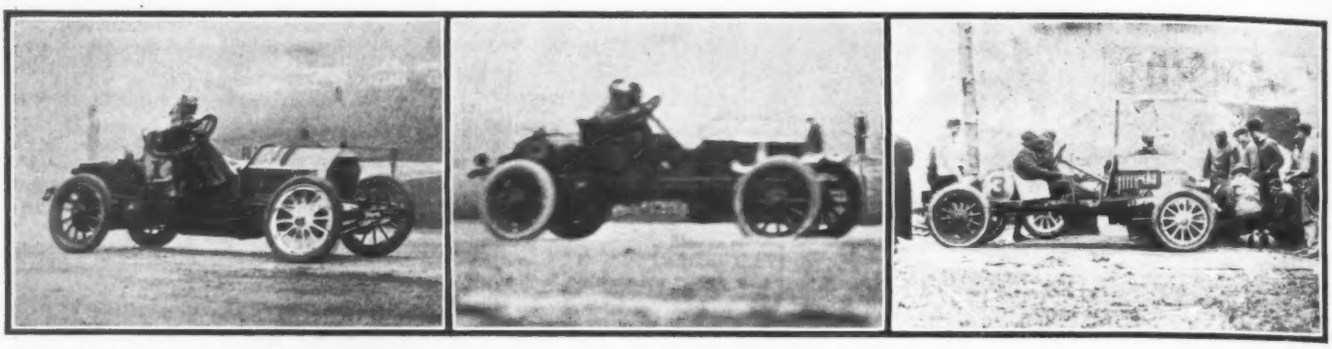
The persons in charge of the race evidently did not expect much of a success or much support on the part of the public because the preliminaries and arrangements did not include anything like adequate provision for a big crowd. Half an hour before the scheduled time for the start, a mass of automobiles half a mile long and five rows deep were congested about the main entrance and the handling of the cars was so slow that many persons who came out to the track with the intention of seeing the start of the race, turned around as soon as they were able to disentangle their cars and went homeward.

Two men had been placed on the automobile gate and, after a long delay, the management sent out a squad of six others to help check in the mass of automobiles.

At 9 o'clock all but about 300 cars had succeeded in getting in and the word was given to line up the racers.

A full dozen machines were trundled out and aligned before the judges' stand and, when the starting shot was fired, they dashed away into an off-shore breeze that was blowing half a gale.

The two Buick entries, one of the Stearns cars and the Fiat set the pace for the first hour. Then the Buick No. 3, under the guidance of the veteran Chevrolet, led until the end of the eighth hour, when it was put out for a time by a mishap to the camshaft. At the end of the ninth hour the Fiat took up the pacemaking, but succumbed to the



Mulford in Stearns Speeding at Brighton — DePalma Making Fast Time in Fiat Car — Arthur Chevrolet in Buick Three, Buick Camp

Ranier at the end of the tenth. By the twelfth hour the steady pace of the Simplex began to tell, and a little extra speed on the part of Basle and Poole put their machine out in front. From the twelfth hour to the finish the Simplex went on about its business and widened the gap between it and its competitors. The winner only made one sharp spurt during the race. All the rest of the time it was driven with just a shade in reserve. It laid off the furious pace of the start and was ready when the time came to shoot past the tiring field. The Stearns car that finished second also avoided the terrific speed of the early pace, and while prominent throughout the struggle did not show its real running until after the fifteenth hour, when it passed the Fiat and settled in behind the Simplex for the run home. The Fiat showed sparkling speed in half a dozen wild bursts and was always a dangerous contender.

Winning Simplex, Poole Driving, As It Appeared After the Strenuous Race

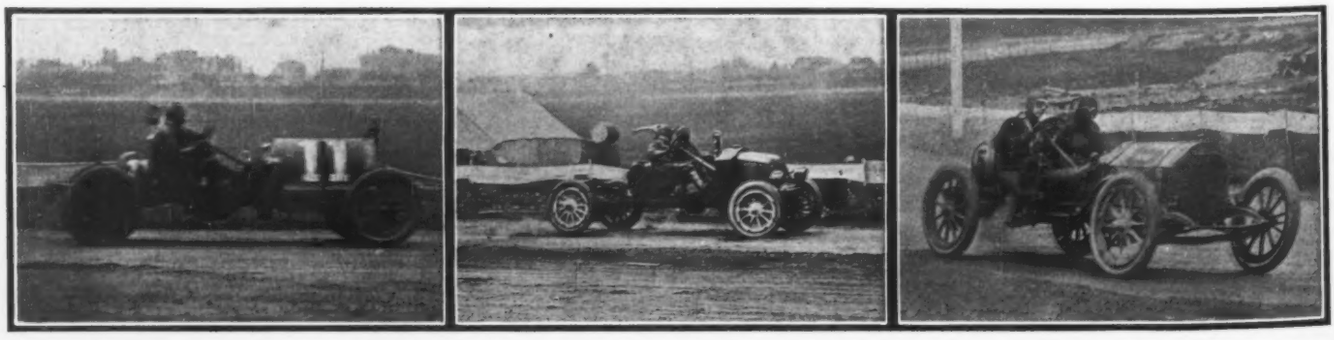
Chevrolet's Buick which set the early pace made a gallant showing despite the loss of nearly two hours early Saturday. At the end it was going along smartly and holding its own. The Rainier plugged along steadily from start to finish, occasionally making high figures and once assuming the lead, but never having quite the necessary ground to loom up as the winner. The showing of the Croxton-Keeton machine was creditable and its progress throughout the race was steady. The Marion, which went through the fence early in the race, made an astonishing finish, running tremendously in the last stages of the contest. This applies also to the Burman Buick.

The Cole and Selden entries were given easy drives and both showed good speed and staying qualities.

Weather conditions were varied during the running of the race. The start was made in the cold, snappy wind, which quieted down as the night grew older. During Saturday afternoon heavy rain fell, soaking the track and the racers but really doing a service in that it smoothed out some of the ruts and furrows that had been torn into the turns by the whirling cars and really made the going a trifle safer.

If the rain had not fallen, some sort of repair work would have been necessary on the clubhouse turn and also on the far stable turn. As it was, the effect of the drenching was to make the course slower for a while. There was only one delay during the race. Shortly before 1 o'clock Saturday morning the red and green signals were displayed at the judges' stand and for fifteen minutes the cars were halted. The incident proved to be a false alarm and the cars were soon sent away again upon their long journey.

The conditions of the race were as follows: It was run under sanction of the A. A. A. Contest Board and in accordance with its rules. The classification was under Class D, which reads: "Open to any gasoline car which complies with the definition of a motor



Disbrow in a Rainier, a Prominent Contender. Croxton-Keeton, a Newcomer, Gained Fifth. Strang in a Marion on One of Lower Turns

car, without restriction as to piston displacement, weight, price or quantity produced."

The start was standing.

A. B. Cordner, chairman of the Brighton Beach committee of the Motor Racing Association, in defining the status of the entries, stated that "There may be stock cars in the race. They are not barred. Neither is any other kind of a gasoline automobile. Any old kind of a teapot had a right to go."

When permission was requested to view the contesting cars from the vantage ground of the paddock, Mr. Cordner emphatically denied it.

"What's the use," he remarked.

But without reference to the value of the race from the viewpoint of the maker and the public, it was a gallant spectacle. Despite inadequate preparations for such a crowd, the sporting picture afforded by the racing machines was inspiring. The successive spurts of the contestants always brought the crowd to its feet and the fine points of driving were liberally appreciated and applauded. Full 30,000 persons paid admission during the 24 hours. Possibly there were 5,000 more.

Behind the stands, in the runways and parked along the streets surrounding the track the greatest aggregation of automobiles ever gathered together, in this country at least, brought the major portion of the crowd. It is variously estimated that there were between 3,000 and 4,000 that succeeded in gaining entrance to the enclosure while the race was being run, and Friday night there were hundreds that did not succeed in getting in. The public got its money's worth of spectacular track racing enjoyment.

The racers failed to break the record through the shower Saturday afternoon, although the pace was not of the record-breaking variety even before that time. However, it is likely that one or two cars, possibly three, might have pressed the mark closely if the rain had not intervened.

Circular Track Collects Its Customary Toll

The weather was inclement; it was much too cold for drivers to remain long in good fettle and the wind blew at a terrific pace, all of which, together with the fact that it was night time and that the track had furrows cut in it to quite some depth after the first hour or so, led up to a rather bad accident to the Marion car which crashed through the fence. It was 18 minutes after 11 on the upturn of the track. William F. Bradley, the mechanician on the car, was the victim whom the grim specter came after. He was taken to the Coney Island Reception Hospital at about 12 o'clock, but his injuries were too severe to be coped with by capable medical attention and his death was ultimately announced. The driver, Gilbert Anderson, was thrown out of his seat and escaped, it is said, without any hurt. The mechanician, Bradley, was 29 years of age, was married, and lived at No. 11 Halsey street, Newark, N. J. He presented much promise in the racing field, and among his most recent achievements was that of driving a Marion car to a perfect score in the Around New Jersey Reliability Run during last Tuesday and Wednesday.

Following is the score of contestants and drivers by hours:

Score by Hours During the Whole Day

No.	Car.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Stearns—Mulford, Patschke	54	109	160	210	221	289	325	370	423	476	528	579	630	677	726	775	824	857	901	952	993	1,038	1,076	1,120
2	Stearns—Howard, Dearborn	56	108	160	213	258	310	349	400	435	Out with broken frame.														
3	Buick—L. and A. Chevrolet	56	112	163	219	269	320	370	408	408	453	508	558	609	654	703	730	774	810	852	894	933	979	1,015	1,049
4	Buick—Burman, De Witt	56	112	160	209	242	242	242	242	268	305	351	405	458	500	536	586	628	661	712	752	793	840	881	927
5	Marion—Strang, Anderson	51	102	151	161	205	249	283	327	375	425	473	520	563	613	661	698	742	770	805	828	870	906	947	989
6	Cole 30—Endicott, Edmonds	49	99	145	185	187	227	236	270	314	353	389	430	448	456	466	503	533	556	588	627	660	692	723	756
7	Houpt—Roberts, Martin	27	72	125	175	203	236	266	266	266	266	296	344	385	422	445	490	526	535	539	571			*	
8	Simplex—Basle, Poole	54	106	155	202	240	289	341	388	440	492	545	598	649	697	745	794	842	880	926	971	1,014	1,059	1,103	1,145
9	Flat—De Palma, Parker	56	109	155	202	244	299	352	395	448	497	545	593	641	689	729	759	808	842	881	930	974	1,018	1,060	1,107
10	Selden—Mack, McMahon	48	94	127	151	155	201	243	285	319	367	399	399	407	451	495	531	569	588	609	637	666	682	691	718
11	Rainier—Disbrow, Owen	54	108	156	208	256	305	353	404	443	496	550	580	616	652	703	747	793	818	865	906	935	959	998	1,037
12	Croxton-K'ton—Lund Spenny	48	95	143	185	231	273	317	360	405	451	491	535	581	621	664	706	752	774	802	845	889	920	963	1,004

*Cracked cylinder.

Paulhan to Try Long Flight

Cable dispatches report that Louis Paulhan, encouraged by the success of his remarkable aerial journey from London to Manchester, will soon try to win the special Michelin prize of $20,000, for the first flight from Paris to Clermont-Ferrand, a distance of 217 miles "as the crow flies" and 268 miles by road.

The rules for the Michelin prize are very simple. The aviator attempting the journey from Paris to Clermont may start anywhere in the departments of the Seine or Seine et Oise. He must first turn a complete circle around the Arc de Triomphe in Paris, and on arriving at his destination he must circle the spires of the Cathedral at Clermont-Ferrand, landing on the summit of the Puy-de-Dome, 4,800 feet high. Two must make the trip, and the time limit is six hours.

Galveston Races in August

Preparations are being made for the automobile races to take place on Galveston Beach, August 3, 4 and 5. Capt. J. W. Munn, who has the arrangements in charge, has announced that more than $3,000 will be awarded as prizes for the winners of the various events.

Entry blanks for the race meeting which will be held on the Galveston, Tex., beach August 3, 4 and 5 have been distributed. The program provides for ten events and cash prizes amounting to $2,225 will be distributed. The ten-mile events will be run over a five-mile circuit and the twenty-mile races will be decided over a ten-mile course. No admission fee will be charged this year and a big attendance is looked for by the management.

Queen City to Have Auto Speedway

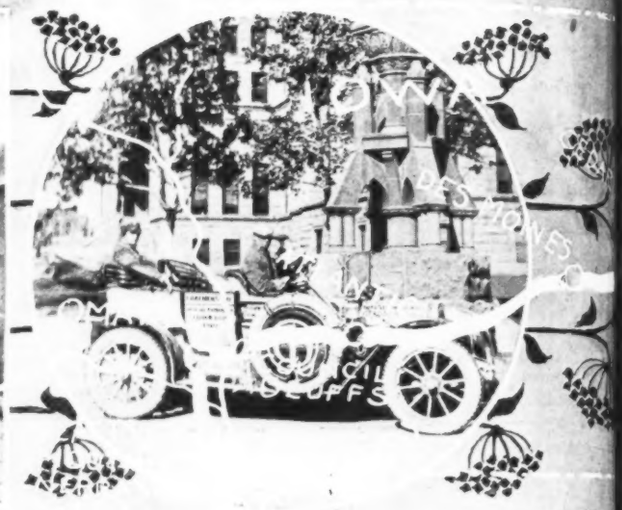
CINCINNATI, May 16—J. T. Earle, president of the National Bank of Latonia, H. H. Meyers, president of the Latonia Jockey Club, and an executive official of the Chesapeake and Ohio Railroad are behind a plan to give Cincinnati a speedway similar to the ones in operation at Indianapolis and Atlanta. Options on a tract of land lying between the Licking River and the Louisville and Nashville Railroad right of way in Covington have been taken, and the purchase of it seems quite probable within a short time.

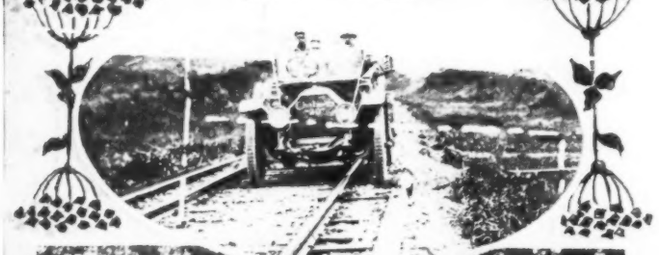
Two Runs for St. Louis Motorists

ST. LOUIS, May 16—Motorists of St. Louis are enthusiastically preparing for the two reliability runs to be held in June. Both the automobile club, which is to give a one-day contest the first week in June, and the Manufacturers and Dealers' Association, which will give a three-day contest the last week in June, have had scouting parties out for a week in an effort to determine the best route. Neither has announced the exact date of the contest it is to give.

Indianapolis Gets Cobe Race July 4

CHICAGO, May 17—The deal between the Chicago Automobile Club and the Indianapolis Motor Speedway, relative to the running of the Cobe Trophy race on the Hoosier Motordrome, was completed to-day when E. A. Moross, manager of the Indianapolis track and the Contest Board of the Chicago Automobile Club, settled the details.





Glidden Pathfinder Com

VIRGIN territory has been mapped out for the Glidden tour for this year; thirteen states are included in the orbit; much of the way is yet to be traversed by automobiles in numbers, but the surprise of the last two years came from the very country traversed. It was not so long ago that automobile makers labored under the impression that automobiles would not find a market in the remote districts for years to come, and it came as a surprise to them when the Western farmers fell into line and became heavy purchasers of the better makes of automobiles.

The path of the Glidden Tour follows the original itinerary, beginning at Cincinnati, O., thence through Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Texas, Oklahoma, Kansas, Missouri, Nebraska, Iowa and Illinois, terminating at Chicago.

The Utility Side of the Glidden Tour

While there is a sportive phase involved in the tour, the fact remains that the industry as a whole is to be benefitted, and in the important ways as follows:

(A) Road building will be given an impetus; this is probably the most important angle.

(B) Manufacturing, not only of automoblies, but accessories as well, will be extended; the Southwest is not now without its automobile industries.

(C) The good news of the splendid ability of automobiles will be spread to the remotest hamlet in the outlying counties; farmers will find further reason for taking an interest in the problem of the emancipation of the horse, and artisans will learn how to part the shackles of industrial life; they may be privileged to work as usual, but they will also learn how to enjoy life in companionship with the automobile.

Present State of Industry in the Southwest

The State of Ohio is now the largest producer of automobiles of all the states through which the tour will be made; Illinois comes next, and the remaining states mentioned are more or less in embryo, but they are accomplishing more than a little, as the following tabulation will show:

Production of Automobiles By States

STATE	AUTOMOBILES	VALUATION
Ohio	40,000	$80,000,000.00
Illinois	10,000	15,000,000.00
Iowa	5,000	10,000,000.00
Missouri	4,000	9,000,000.00
Kentucky	500	600,000.00
Tennessee	300	400,000.00
Kansas	300	400,000.00
Nebraska	250	300,000.00
Texas	100	100,000.00

The total production of automobiles in the states through which the Glidden Tour will pass is in excess of 60,000, as estimated for 1910, the total value being $134,000,000.00, giving employment to 60,000 men, expending for labor more than $50,000,000.00 in the manufacture, which figure allows nothing for the indirect expenditures, as in garages, repair shops, and in divers other ways. That these secondary methods of employment are beyond the dream of the man who contents himself with merely existing will be indicated

pletes Its Strenuous Task

by the mere statement that the upkeep of the automobiles made in these states is worth $25,000,000.00 to the men who do the work, counting the money which must be devoted to this service.

The cost of upkeep of the automobiles made in these states is figured on a basis of 20 per cent. of the selling price, and considering this basis it is fair to point out that good roads are needed. It is hoped that the citizens of these states will reach the same conclusoin as that which actuates the road commissioners of such states as Massachusetts, New Jersey, and divers other Eastern states; it has been learned that the cost of upkeep of automobiles and of roads falls upon the citizens at large.

Good Roads Will Help To Solve Problems

If the Glidden Tour is in the nature of a missionary undertaking, it is not too much to say that the propaganda for good roads is one of the prime, if not the paramount, considerations. The progressive idea everywhere in America is based upon better means of transportation; improvement is the high aim, and the time has come when scientific road building must support mechanical means of hauling merchandise.

It is estimated that $90,000,000.00 represents the present annual expenditure for road improvement, of which considerable sum fully one-half is utterly wasted. It has been said that much of the money expended on road-building was to no purpose, the rain and the frost undoing the work as fast as it is completed. The great question is to build roads, but it is of equal importance to build them well. Just now the Federal Government is taking an interest in the work; just at the present time the Federal Government is indicating its serious intentions through Bill No. 6931, which has been favorably reported by the Senate Committee on Agriculture, which provides for an appropriation of $500,000 for the extension of the work of the U. S. Office of Public Roads in aiding in the improvement of the public highways.

Highway Departments To Care For Roads

The several states are awakening to the seriousness of this great situation, evidence of which is sufficiently indicated by the proposed act creating a State Highway Department, and establishing a State Highway Commission, and the office of State Highway Engineer, all with a view to the construction, maintenance and repair of public highways and bridges in the State of Michigan. To fully appreciate the part which the Federal Government is taking in these matters, knowledge of the activity of Logan Waller Page, Director of Public Roads, U. S. Department of Agriculture, will have to be taken into account. The activities in Michigan at the present time reflect the skill and knowledge of Director Page, who drafted the Michigan Act on behalf of the Michigan State Grange. Many states are falling into line, the National Grange is doing masterly work, and it is the idea everywhere to study the whole situation from a scientific point of view and respond to the demands of the farmers.

It is the confidential hope of the projectors of the Glidden Tour, that the citizens throughout the Southwest, to whatever extent they fail to appreciate the true situation, will reach a better understanding of the importance of the automobile and good roads. Instead of wasting nearly $50,000,000 per annum in the maintenance of roads which are but roughly improved, and instead of wearing out good automobiles on just such highways, the light, as it comes from the experiences gained, reflects the more stable condition—it is the light of experience.

(*Continued on Page 941*)

Last Word About Harrisburg Endurance Run

HARRISBURG, Pa., May 12—The final results of the 3-day reliability tour conducted by the Harrisburg Motor Club were announced by Referee W. R. Douglas at 5 o'clock this afternoon, practically the entire day having been consumed in giving the cars a strenuous brake test and a thorough technical inspection to discover all breakages.

In the class A for touring cars, $2,000 and over, a Pullman was the winner with a perfect score. In class B touring cars, under $2,000, the Inter-State was victor with 11 points penalty, 8 points received on road work the last day and 3 points in the final examination, made up of 1 for bent fender iron, and 2 for a loose motor bearing, which bearing was not in adjustment when the tour started. In the runabout division, class C, over $1,600, a Kline Kar was winner with a perfect road score and perfect technical examination. In the runabout division, class B, under $1,600, a little two-cylinder Maxwell carried off honors from larger cars, winning as it did with a perfect road score and passing a perfect technical examination.

The report of the first two days of the tour as far as road performances are concerned appeared in last week's issue of THE AUTOMOBILE. The third day's run from Wildwood, N. J., to Harrisburg, by way of Philadelphia, a distance of 197 miles, proved the hardest of the tour. A heavy rainstorm drenched the tourists as far as Philadelphia, and from Philadelphia to Harrisburg a previous rain had put the roads in bad shape.

The Franklin No. 13, driven by John Burns, was the only car to have a perfect road score and outdoor tests but to suffer on the technical examination, receiving as it did 3 points, 2 for a broken muffler support, and 1 for a loose cover on a universal. No. 9 Kline Kar made a particularly good performance, being clean in every respect except for 5 points brake penalty. Of the nineteen cars which took the final examination eight passed it without revealing any derangement that brought a penalty upon them, these eight being the Pullman, Kline Kar in class A, the Enger in class B, two Kline Kars and a Pullman in class C, and the Maxwell and a Kline Kar in class D.

FINAL RESULTS—HARRISBURG 3-DAY RUN

Car No.	Make of Car	Entrant	Driver	Time and Work on Road 1st D'y	2nd D'y	3rd D'y	T'l	Penalties for Outdoor Tests Br.	Cl.	G'r	Pts	Technical Test	Grand Total Points
			Class "A" Touring Cars, $2,001 and Over										
36	Pullman	Pullman Motor Car Co.	Norman Gallatin.	0	0	0	0	0	0	0	0		0
13	Franklin	H. H. Franklin Mfg. Co.	John Burns	0	0	0	0	0	0	0	3	2—Broken Muffler Support 1—Loose Cover Universal joint	3
8	Kline Kar	Keystone Motor Car Co.	R. L. Morton....	0	0	0	0	7	0	0	0		7
10	Kline Kar	T. C. Neely	Sam Cole	0	0	0	0	42	0	0	4	1—Fan belt off 1—Water leak 2—Loose muffler	46
37	Pullman	W. C. Longstreth	Herb Bitner	0	1	2	3	46	0	0	2	2—Glass oil gauge lost 3—Loose ignition coils	51
45	Columbia	Prescott Adams	E. Yeager	19	0	0	19	26	5	0	13	7—Disabled throttle control 2—Loose mud apron 1—Oil plug lost	63
			Class "B" Touring Cars, Under $2,001										
41	Inter-State	Inter-State Auto Co.	W. W. Vandergriff	0	0	8	8	0	0	0	3	1—Fender iron bent 2—Loose motor bearings	11
12	Regal	Andrew Redmond	Frank Hosmer ..	0	6	0	6	24	0	0	20	15—Broken manifold exhaust 2—Mud apron loose 2—Loose muffler 1—Lock nut loose	44
46	Enger	Enger Auto Co.	H. L. Brownback	0	9	5	14	45	0	0	0		59
49	Kline Kar	B.C.K. Motor Car Co.	W. McCully	0	3	22	25	53	0	0	3	2—Petcocks leak 1—Lost spring bolt nut	81
			Class "C" Runabouts, $1,601 and Over										
7	Kline Kar	B.C.K. Motor Car Co.	J. H. Kline.....	0	0	0	0	0	0	0	0		0
35	Pullman	Pullman Motor Car Co.	Herbert Welker .	0	0	0	0	5	0	0	0		5
47	Marion	W. J. Sprankle	E. Greenwood ..	0	0	0	0	4	0	0	5	2—Front fender bent 2—Front guard rod bent 1—Lost hub cap	9
56	Kline Kar	B.C.K. Motor Car Co.	W. P. Seig	27	0	3	30	5	0	0	0		35
34	Pullman	Pullman Motor Car Co.	H. P. Hardesty..	1	0	0	1	36	0	0	2	2—Nuts off rear spring hanger	39
11	Mitchell	Ideal Motor Car Co.	G. F. Snyder	15	Faulty Carbureter							Withdrawn	
			Class "D" Runabouts, Under $1,601										
57	Maxwell	Andrew Redmond	A. D. Rea	0	0	0	0	0	0	0	0		0
9	Kline Kar	B.C.K. Motor Car Co.	C. C. Fairman....	0	0	0	0	5	0	0	0		5
48	Overland	W. J. Sprankle	E. Craig	0	12	0	12	0	0	0	24	20—Broken spring 2—Loose truss rod 1—Rear mud guard bent 1—Water leak	36
43	Warren-Detroit	Keystone Motor Car Co.	Tom Berger	0	0	58	58	9	0	25	1	1—Gasoline leak	93
39	Pullman	H. R. Averill	Geo. Iches	0	15	Universal broken						Withdrawn	

Kansas City Automobile Club Annual Hill Climb

KANSAS CITY, Mo., May 14—Watched by 3,000 spectators who had driven 10 miles to reach the firing line, the annual hill-climb of the Automobile Club of Kansas City, which was held on Dodson Hill this afternoon was a most interesting affair which resulted in a new record for the climb, made by A. O. Brooke driving a Lexington 40. Brooke, agent for the car here, held the previous record of 59 3-5 made in a Stoddard-Dayton in 1908, but he eliminated this entirely to-day when he climbed in 55 2-5 for the .6 mile. Summaries:

Event 1—Cars costing under $800. Krit, time 1:31 1-5.

Event 2—Cars costing between $801 and $1,200. Ford, time 1:06 1-5; Ford, 1:27.

Event 3—Cars costing between $1,201 and $1,600. Parry, time 1:06 2-5; Great Western, 1:07 2-5; Everitt, 1:18 3-5.

Event 4—Cars costing between $1,601 and $2,000. Jackson, time :58 4-5; Henry, 1:10; Auburn, 1:12; Enger, 1:15; Herreshoff, 1:27 1-5.

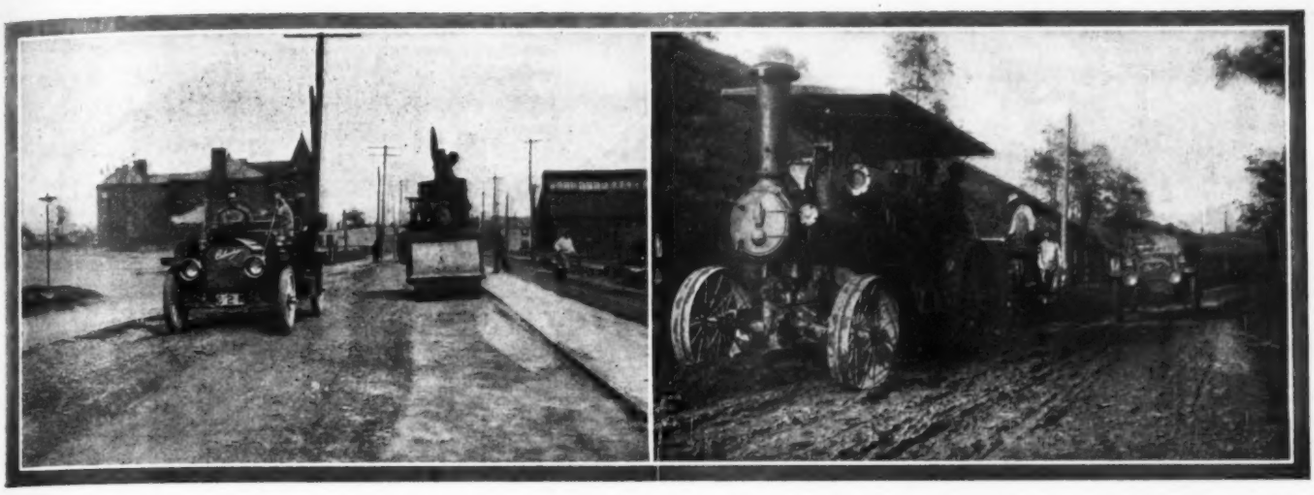
Event 5—Cars costing between $2,001 and $3,000. Pennsylvania, time 1:03; Jackson, 1:06 4-5; Great Smith, 1:10 2-5.

Event 6—Cars costing between $3,001 and $4,000. Palmer-Singer, time 1:05; Palmer-Singer, 1:06 1-5; Palmer-Singer, 1:26.

Events 7 and 8—No entries.

Event 9—Free-for-all, cars under $3,000. Jackson, time :55 4-5; Lexington, :56; Great Western, 1:00; Apperson, 1:00 4-5; Ford, 1:00 4-5; Great Smith, 1:02; Jackson, 1:05.

Event 10—Free-for-all. Lexington, time :55 2-5; Jackson, :56 1-5; Apperson, :59 1-5; Great Smith, 1:00 4-5.



Improving the Roads at Perth Amboy, N. J. Roller at Work

Steam Tractor Pulling Scraper, Road Improvement at Roanoke, Va.

New York Atlanta Pathfinder Enthusiastically Received

AFTER a trip that consisted of a series of ovations and receptions, the pathfinder car of the New York *Herald*-Atlanta *Journal* National Highway, Good Roads tour reached its destination in Atlanta, Monday. The Columbia 45-horsepower car made the trip without major mishap of any sort.

The car traversed every known variety of roads and a few that had been practically unknown up to the time of their discovery by the explorers. But in the main the going was good and in fully half of the course selected for the tourists next month, the roads were almost good enough to race over. Here and there a bad spot was found and then a little further along, the way would be worse, but from one end of the line to the other, there was only one space of any great importance upon which road-builders and road-repairers were not busy.

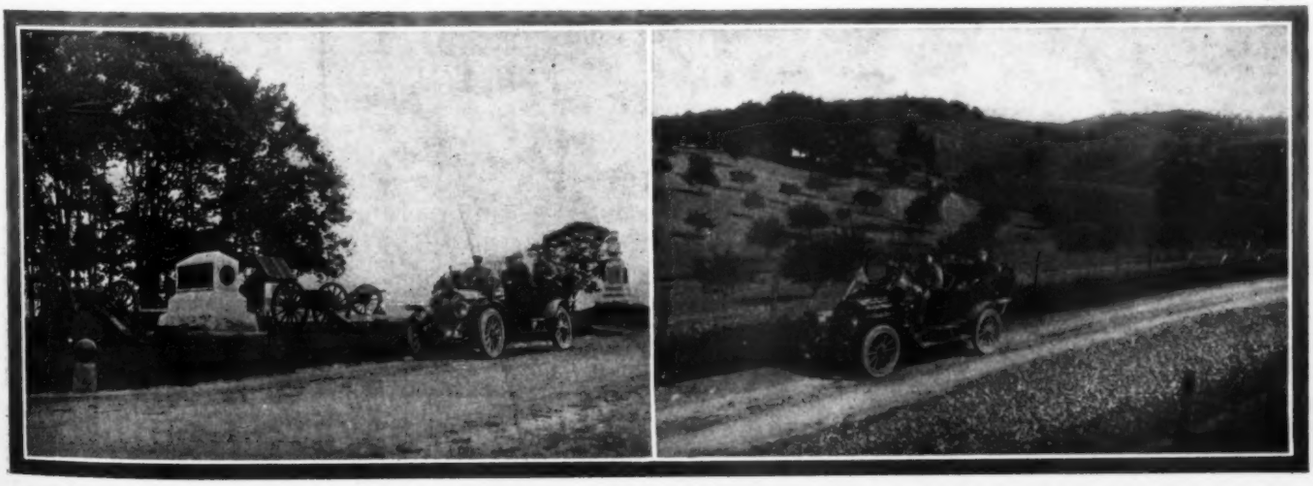
This spot is near Gettysburg, Pa., where the attitude seems to be that "we get all the tourist travel anyhow; what's the use of spending money on the roads?"

Across New Jersey and almost as far as Gettysburg, the roads were in their usually excellent shape and after passing the scene of the fiercest battle of the Civil War, with all its historic interest, the highways toward the South improve with abruptness. Through the foot-hills of the Blue Mountains and down the valley of the Shenandoah the going was enjoyable, although it will be better when the tour proper passes that way. The Maryland roads were in fair conditon and the course from Hallstown to Charlestown was being given a very thorough scraping and filling in preparation for the tour.

From there to the Virginia line, road building machinery was to be seen all along the way. In Virginia road-rollers and gangs of men were engaged in road work at several places and already the route to be followed by the tourists is comparatively free from "thank you ma'ams." From Harrisonburg to Staunton, the road is in racing condition. When the pathfinder approached the mountains near the Natural Bridge some dangerous bits of road were encountered on account of rains that fell earlier in the week but there was no mishap and the scenic bit of the tour was accomplished with ease.

At various points along the way, delegations of automobilists met the pathfinders and escorted them from time to time. Everybody seemed enthusiastic over the tour and numerous tentative entries were made by enthusiasts along the way. Good roads and the reasonable administration of just laws were the keynotes of the welcoming speeches delivered everywhere. Whenever the car crossed a state line, there was always a delegation awaiting to give greetings and good cheer.

The effect of the road building last year was still distinctly in evidence and the effort that is being made all along the route, indicates that before the tour starts, the course will be in good shape all the way from Atlanta to New York. In addition, many roads are now being hurriedly improved.



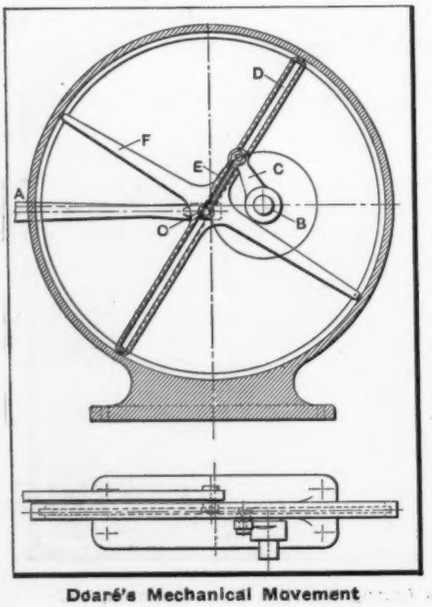
Passing the Historic Battlefields of Gettysburg, Pa.

Good Macadam Roads Among the Hills Near Staunton, Va.

Engineering Digest

A carefully abstracted digest of accounts of engineering activities as they are reported in society transactions and technical papers throughout the world.

A mechanical movement which might permit designers of four-cycle motors to realize a long power stroke, with complete expansion of the gases, in conjunction with short suction and compression strokes, is suggested by E. L. Doaré in *Revue Mécanique* for December, 1909. The expulsion stroke must of course be as long as the power stroke. The author is not sanguine with regard to the practical utility of his plan, but submits it for what it may be worth, and *La Technique Automobile et Aerienne* of February 15 presents it with more confidence in its practicability. The basic idea is to make the connecting-rod knuckle describe alternately a small complete turn and a larger complete turn, instead of two circles around the crankshaft axis. Means to this end is found in the Pascal snail curve described by the point *M* on the line *OR*, when the latter turns around *O*, and *M* is a constant distance from the point *N*, which is the variable point of intersection between the circle *W* and the line *OR*. While no shaft fixed at *O* can be used in a motor without interference with the crankshaft, which is represented by the center of the circle *W*, the point *O* can be fixed by means of a revoluble ring with a slotted diametrical member, the latter representing the line *OR*. In the illustration, *A* is the connecting rod, *B* the crankshaft, *C* the crankarm, *D* the slotted diametrical member, *E* a sliding member connecting the connecting-rod knuckle with the crankarm pin, and corresponding to the distance *MN* in the diagram. *F* is another diametrical member serving to brace the revoluble ring. It will be noticed that the slotted member turns only 180 degrees when the crankarm makes a complete revolution, and that the movement of the connecting-rod knuckle must be on the order of the double curve shown in the diagram. The mechanism devised would admit of only single-cylinder construction, for reasons which are made apparent by glancing at the plan view below.

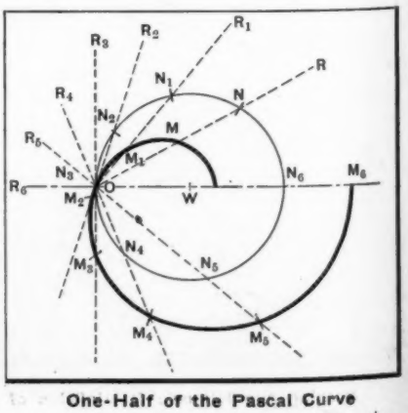


Doaré's Mechanical Movement

Diminutive electrical motors, which may be used for laboratory work, and perhaps for models of aeroplanes in connection with a diminutive rapid-discharge storage battery, engaged the attention of the members of the *Académie des Sciences,* as reported in the *Comptes Rendus* for this institution for April 11. Mr. Carpentier showed the members a dynamo which, so far as known, is the smallest that has ever been made, though its maker, a Mr. Trévet, thinks he could make one still smaller if put to the test. The dynamo is of the Gramme "superior type" and weighs 7 grammes, or 0.3 ounce. It is 15 millimeters in height and length and about 13 millimeters wide. The field is wound with wire of 0.05 millimeter thickness, silk-insulated, and carries 600 turns. The armature is keyed to a shaft whose bearings are only 0.5 millimeter wide, and measures itself only 6.02 millimeters in diameter. It is of the toothed type and in twelve sections. It is wound with 1.67 meters of wire 0.05 millimeter in diameter. The collector-ring and brushes are put together as those of large dynamos and composed of many pieces. The brush-holder is keyed adjustably. All pieces are assembled by means of screws, no solder being employed, and the whole little machine can be taken apart and put together like a standard dynamo. With a little pocket battery, Mr. Carpentier made the dynamo turn as a motor at the meeting. Idle, it turned at extreme speed, causing a buzzing like that of a large insect, and used 0.2 ampere at 3.5 volts, say 0.7 watt. Neither its work nor its speed could be measured.

Recent advancement in economy to be gained by the use of internal combustion motors in seagoing vessels is illustrated through the results obtained with the tug boat Rapido, built at the Krupp Germaniawerft at Kiel. The trials of this boat were witnessed by representatives of the German navy and by many shipbuilders and chandlers from other countries. The Rapido is 15.3 meters (50.20 feet) over all, has 3.6 meters (11.82 feet) beam, 1.15 meters (3.77 feet) draft, and a displacement of 20.7 tons. The motor is of Krupp design with self-ignition on the Diesel plan, and is reversible. At 400 r.m.p. the six cylinders develop 120 effective horsepower and produce a speed of 10½ knots. The towing pull at 6½ knots reaches 1,200 to 1,300 kilograms (2,645 to 2,866 pounds). The measured fuel consumption is 180 grammes (7.70 ounces) per horsepower-hour. The total weight of the motor with full running equipment is 4,400 kilograms (9,700 pounds). These figures compare well with those of stationary Diesel plants.

Considering that the towing capacity referred to is obtained with a displacement of only 20.7 tons, an important superiority in this respect is noticed over steam tugs, writes *Teknisk Tidskrift* of Stockholm for March. A steam tug with the same towing capacity would require a displacement of 50 tons, and the larger boat requires more power to move itself and must have a more powerful engine in order to tow as well. In calculating fuel cost, one should, therefore, compare the 120-horsepower crude oil motor with a larger steam engine, but even if similar horsepowers are compared, and it is assumed that steam consumes 1 kg. coal as against



One-Half of the Pascal Curve

180 grammes (7.70 ounces) of crude oil, a considerable saving is shown. If a ton of coal costs 16 kroner ($4.30) and a ton of crude oil 40 kroner ($10.75), without duty, and 72 kroner ($19.35) with duty paid, the fuel cost for steam will be 0.016 kroner per horsepower-hour (0.45 cent), and for crude oil 0.0072 kroner (0.2 cent), without duty, and 0.0139 kroner with duty (0.37 cent); in other words, a saving of 20 to 56 per cent., according to whether duty is paid or not. (For government use the duty need not be considered, of course, and the Swedish engineers evidently have this in mind.) Another advantage, especially for larger vessels, lies in the reduction of personnel. Stokers are dispensed with, and this about balances against higher cost for attendance and maintenance. These advantages and the larger radius of action for the vessel with oil motor, appear most clearly by comparison of the engine plants of larger vessels. Suppose a freighter of 7,500 tons and of 2,500 effective horsepower makes 11½ knots. With a steam plant, such a vessel uses in 24 hours about 45 tons of coal and, with 2,000 cubic meters of bunker space, has a radius of about 12,000 nautical miles. The same ship equipped with crude oil motors uses under similar conditions 13 tons of crude oil. The radius is increased to 38,000 nautical miles, i.e., more than tripled. Equalizing the radii, the oil motor boat can take in freight its saving in fuel space or weight. In the example used, the additional cargo would be 1,350 tons, or a gain of 18 per cent. over steam assuming that both power plants are of the same weight. In reality, the oil motor plant can be built lighter than a reciprocating steam engine plant. The economy of the oil motor in operating cost comes under the heads of fuel, wages and materials for maintenance and lubrication, and amounts, for a voyage of two weeks' duration, for vessels such as referred to, to 2,700 kroner ($726), the operation of the steamboat costing 10,800 kroner ($2,903), and that of the oil-motor vessel 8,100 kroner ($2,177). While the first cost of oil motors exceeds that of a steam plant and calls for higher disbursements for interest and sinking fund, this is compensated for in the shorter wharfage time, since the crude oil is more easily taken aboard than coal, and also by saving in fuel for firing up and keeping up steam. Calculating that a vessel yearly makes 18 voyages of two weeks each, a total saving of 48,600 kroner ($13,037) is effected in cost of operation alone, to which should be added the gain resulting from the 18 per cent. addition to the freighting capacity. Apart from economical advantages, the absence of smoke should militate in favor of oil motors, especially for passenger boats and naval vessels, and the reduction of heat radiation, which is a source of trouble and sickness of the crews in steamships, especially in the tropics, should be considered. Even if the foregoing figures, concludes the Swedish commentator, are not yet realized for large vessels, they show the economical superiority of the large oil motor plant and furnish an argument for producing larger and larger motors, so that the internal combustion motor industry may gain the place in seagoing transportation to which it is intrinsically entitled.

Many microphotographs of welds are presented in an article by Ch. Fremont appearing in *Le Génie Civil* for February 26. While dealing largely with the welding of boiler plate, with special reference to the accidental explosions which have taken place in the French navy vessels, the author arrives at the general conclusion from facts of record that riveting is always superior to hammer welding and hammer welding always superior to autogenous welding, under equal precautions for securing competent workmanship, and also that the fact that a weld has endured the normal stresses to which it is subjected for a number of years, affords no guarantee whatever against a sudden rupture. Electrical welding is not considered in the article.

M. B. Galitzine, of St. Petersburg, Russia, presents an illustrated description of a simple apparatus for measuring the horizontal and vertical tremblings of a building caused by the operation of a four-cylinder Diesel motor in an adjacent factory. *Comptes Rendus de l'Académie des Sciences,* April 11.

So as to have each automobile provide its own dust protection, Franz Ragaller, coppersmith to the Court of Bavaria, at Munich, has designed and executed a water-sprinkling device for automobiles comprising two oblong reservoirs to be attached under the running boards on both sides of the vehicle, a system of discharge valves and ingenious shields preventing dirt and dust from clogging the apparatus. The reservoirs hold 50 to 100 liters, according to the size of the car to which they are to be attached, are divided by bulkheads to obviate swashing and have bottoms sloping slightly to both ends to facilitate the feed of the water to the sprinkling roses. The feed may be regulated by means of self-closing slides in the discharge pipes which are controlled from a battery at the driver's seat. *Allgemeine Automobil Zeitung* for April 22 states that the device wets the tires and that the latter, therefore, raise no dust and leave a moistened and dustless track, but does not explain in what manner the water reaches the front portion of the front wheels before the latter strike the dry road before them.

Under the misapprehension that motors for aeroplanes should be required to work constantly close to their maximum capacity, and that 70 to 80 degrees centigrade should, therefore, be the highest temperature which the cooling water in an aeroplane motor should be allowed to reach, German manufacturers have gone into the otherwise laudable enterprise of producing radiators with a higher capacity for a given weight than is possessed by the standard automobile radiator. Erwin Aders describes the methods adopted to this end in *Der Motorwagen* for April 10, with illustrations of the construction parts. With the use of the customary materials, the desired cooling capacity could not be accomplished at less than a weight of 1½ kilograms per horsepower, and reduction of the gauge of the sheets and pipes is excluded by reason of the porosity of the metals. A change to aluminum is indicated, because this has a specific gravity of 2.75 against 8.5 of brass, and a conductivity of 175 against only 55 to 110 for the brasses. As, however, aluminum cannot yet be soldered with the same assurance of a good job by simple work methods, the true cellular types of radiators are not available, and aluminum radiators must be of the vertical pipe pattern. In one case, holes are stamped in aluminum sheets 5 millimeters in thickness, and the ends of aluminum tubes are expanded into these holes, somewhat as the fire flues are secured in boilers of certain steam vehicles. The necessity for leaving enough material between the holes reduces the weight-saving accomplished in this type. In another type, in which the tubes are flattened except at the ends the design is similar to that seen in Renault cars of the older models, and the bottom of the lower, as well as the cover of the upper water-containers, is removable, forming part of a frame composed of four tin plates braced by diagonal wires. The construction, so far, is expressly intended for aviation motors only.

Looking ahead for the revolving engine is the title of a masterly editorial in the May 7 issue of *The Autocar* (English), in which the writer takes up the reasons for the success or failure of various types of engines, as exemplified in the automobile business. Following this, he reverts to the present state of aeronautics, and deduces the idea that, first, the aeroplane owes its ability to fly, its very existence, to the automobile engine, but beyond that the revolving cylinder type of engine is the best one and the one that will be most used in the future. He arrives at this through a consideration of Messrs. White and Paulhan in their competition for the English *Mail* prize. Some of the statements made are of sufficient interest to warrant reproduction. The writer says in part: "The flying machine owes its ability to fly to the motor-car engine. Now, it seems as though it might repay its debt to the light car by the evolution of a type long since discarded by the motor-car builder, though indirectly he has made its use possible by the improvements in material, design, detail, and workmanship which he has brought about in the past ten years. The ideal engine is the gasoline turbine though that is far away.

Questions That Arise

A series of practical questions relating to the automobile, its parts, and their functions, which arise upon various occasions, together with easily understood answers to the same.

[1]—What is the relation between piston velocity in feet per minute and angular velocity of the crankshaft in revolutions per minute?

Taking the crankshaft velocity as 1,000 feet per minute for the maximum safe practice, the speed in revolutions per minute, referring to the crankshaft, may be found as follows:

$$S = \frac{F}{\left(\frac{s \times 2}{12}\right)}$$

When,

S = crankshaft speed in revolutions per minute.

F = piston speed in feet per minute.

s = stroke in inches.

Fixing the piston speed at 1,000 feet per minute, and the stroke at 6 inches, the crankshaft speed will be 1,000 revolutions per minute, since:

$$S = \frac{1{,}000}{\left(\frac{6 \times 2}{12}\right)} = 1{,}000$$

In the same way, any other crankshaft speed may be ascertained for any other assumed piston speed, for any given stroke.

[2]—Why is it necessary to limit the piston speed to 1,000 feet per minute as a maximum?

It is not necessary, but it may be desirable. The piston speed of a motor, if counted, in some measure, for several reasons, reflects the life of the motor, and the adequacy of the service it will be likely to render. In racing, the speed frequently goes up to 2,000 feet per minute, and under touring conditions, the probabilities are that the average piston speed, for all-day performance, is inside of 500 feet per minute. In a general way, the strain to which the motor is subjected, considering these differences in piston speed, is in the ratio of 1 to 16. Obviously, the racing condition, if it puts the motor under 16 times as much strain, is bound to reflect seriously upon the life of the motor, whereas, under touring conditions, the life of the motor will be very much longer. The question then, of what the piston speed should be, as it is ordinarily measured in feet per minute, is one which must be solved, in view of the effect of speed upon depreciation, and the right piston speed will be that which will limit the depreciation to, say, 10 per cent., or some other acceptable value.

[3]—What is the relation of torque to power of a motor?

The force of the twisting moment or torque is a measure of the power of the motor, the relation being as follows:

$$H.P. = \frac{2\pi R S P}{33{,}000}$$

When,

$2\pi = 6.28$

R = radius of the lever arm in feet at the end of which the force P in pounds acts.

S = speed of rotation in revolutions per minute.

P = pull in pounds (representing the torque or twisting moment) at the end of the lever arm of radius R.

H.P. = Horse Power.

33,000 = the number of foot pounds said to represent 1 horsepower.

Transposing,

$$P = \frac{H.P. \times 33{,}000}{2\pi R S}$$

[4]—Is the torque of a motor constant, irrespective of speed?

Theoretically, yes; practically, no.

[5]—What are the reasons in practice for torque modifications?

Since the torque of a motor is an expression of the energy set free when the mixture is ignited, and since the force of the explosion, so called, is modified (a) with changes in the weight of fuel utilized (b) with changes of compression, the conditions as follows must be recognized. The compression will be lowered when the motor is running slow, because there will be more time for mixture to leak by the piston rings, and there will be more time for the heat to pass away through the cylinder walls to the water in the water-jacket, thence to the radiator, where it will be absorbed by the passing air current.

Increasing speed also has its effect upon the torque, and beyond a certain range in the speed for any given motor, the torque decreases with further increases in speed, due to wire drawing as the mixture passes through the valves, a depression in the intake, due to the small size of the same, and back pressure in the exhaust manifold, for the same reason. There are other pumping loss factors which will have to be taken into account in a closer examination of this phase of motor operation, but these are conspicuous reasons for a modification of the torque characteristic of a motor.

[6]—If it is true that an intake depression reduces the power of a motor through its modification of the torque characteristic, and if this condition obtains because the intake is restricted, why is it not proper to enlarge the same and obviate this difficulty?

Within prescribed limits, the remedy lies in having the intake large, of suitable contour, and with a perfectly smooth bore. In view of the fact, however, that the intake valve opens before the flame is quenched in the combustion chamber, popping back must be guarded against, and this troublesome difficulty is only to be overcome if the area of the intake is such that the speed of travel of the mixture en route to the combustion chamber is higher than the rate of flame travel in the mixture itself. If the flame propagates through the mixture at a rate so fast that it will overtake the stream, combustion will take place in the intake manifold instead of in the combustion chamber and in this way the so called "popping back" difficulty is brought about.

[7]—If the torque of a motor decreases with increasing speed for reasons which are unavoidable, is it not a fact that the power of the same motor will decrease with increasing speed?

As the formula indicates, the power of a motor is proportional to the torque on the one hand, and the speed on the other. Power, then, is represented by torque multiplied by speed. The

best power of any motor is found in the range of its speed at which torque time speed finds its greatest value. If the speed is very high, the torque may be relatively low for a given power; if the speed increases at a rate higher than the rate of decrease of the torque for speed, the power will be increasing with the speed, or, if the torque remains constant, power will be in direct proportion to speed. Conversely, if the speed is held constant, the power will change in direct proportion to torque changes.

[8]—To what extent are these changes to be noted in practice?

Considering automobile motors in average practice, the best condition seems to obtain when the piston velocity is between 800 and 1,000 feet per minute.

[9]—How hard should a valve spring press the valve against its seat?

There is no fixed rule for this; the pressure should be measured in pounds per square inch. It is claimed that 40 pounds per square inch will suffice for every need.

[10]—Why should the pressure be measured in pounds per square inch?

After a valve closes, which it does in response to the pressure exerted by its spring, all that remains to be done is for the valve to stay on the seat with sufficient firmness to assure that it will be tight against leakage. Despite this relatively slight duty, the situation is one demanding some pressure, for the reason that the suction tends to open the exhaust valve, due to the depression in the combustion chamber (cylinder). The amount of the depression, as measured in pounds per square inch, demands that the pressure exerted by the valve spring be more than the suction per square inch, and that this pressure on the seat by the valve be in like value, i. e., in pounds per square inch. In addition to the overcoming of the depression, it is necessary for the pressure of the valve on the seat to be enough to squash down any foreign substance that may find lodgment there, and in addition, it is necessary to squeeze excesses of oil off of the surface in order that the valve may seat; it is probable that 40 pounds per square inch is adequate for the purpose.

Were the pressure measured in pounds, independent of the area of the seat, it is possible that the pressure in pounds per square inch would be below the requirement, due to the fact that the depression in the cylinder, as measured in pounds per square inch, would be so great that the pressure on the seat, resultant of the ability of the spring, would be below the requirement, and the valve would not then press against the seat enough to assure tightness.

[11]—Why is it that conical valves are so much used?

Considering the question of the pressure, which is exerted by the valve spring, the conical seat offers certain advantages; a spring of a given strength, working against a conical seated valve, is favored by the wedging acton, due to the shape of the seat. In addition to this is the fact that the foreign substances which may find lodgment on the seat during the time the valve is opened will be scraped off as the valve is closed; this action cannot take place when the seat is flat; in a flat-seated valve, under the circumstances, the foreign substances must be pulverized, and even then they may not be driven out from under the seat, and a leak will result. There is also danger of damaging the flat seat if foreign substances find lodgment there; when the valve closes under the action of the spring, the seat pressure is enough to drive any hard substance into the metal of the seat, and in the course of time it is possible that the seat will crumble away, just as asphalt pavement does, as the direct result of small surface blemishes, they being made by the cauks of horses' shoes.

[12]—What are the advantages of flat-seated valves?

They open freely, due to the absence of wedging action. The effective area is greater, considering a given outside diameter of the valve. The area of the rest remains constant even after repeated grindings.

[13]—Why not regard these advantages as well worth having in every motor made and used?

All roads lead to Rome! As an answer, this fixed phrase may not be sufficiently clear for the purpose; it may be supplemented by the further statement that (a) the wedging action of conical valves is not sufficient to serve as a detriment; (b) the difference in area between the flat and the conical seat is not enough to make it difficult to have the conical seated valve as much larger as the difference may indicate; (c) the increase in area of the conical valve, while it may ultimately have to be corrected, is at such a slow rate that it is a matter of several years' service before the trouble will become eminent, and, even when it does come up for treatment, it is easy to deal with; against this is the fact that the conical valve has certain advantages which are well worth considering when a decision is being made.

[14]—What other qualifications must the valve spring have?

Besides closing the valve, there is the necessity of doing so as quickly as possible. If the spring is not sprightly the camroller will not hug the cam, and noise will result. In addition to this, unless the spring closes the valve as quickly as the cam will permit, as it engages with the roller, the timing will go awry. There is no use of going to the trouble of timing the opening and closing of the valves unless the springs will act as quickly as to serve for the intended purpose.

[15]—How soon should the spring close the valve?

The exact time depends upon the requirement as fixed by the designer of the motor in view of the service to be rendered. This question, however, has for its scope the idea that the valve may not be closed, excepting after a certain time has elapsed, due to inertia of the reciprocating mass; the closing should take place within the time taken for the camshaft to rotate 20 deg.

[16]—What has inertia to do with the closing of a valve?

Accordingly as the valve is increased in weight, the inertia factor will increase, and the greater will the time of closing the valve be, considering a given strength of the spring placed to do the work. If the valve-lift is also operated by the spring, it, too, will have to be taken into account.

[17]—What is inertia?

It is the property of a body by virtue of which it tends to continue in a state of rest or motion in which it may be placed, until acted on by some force.

[18]—What are the laws to which inertia responds?

Newton's laws.

[19]—What are Newton's laws?

There are three to which reference will be made as having bearing upon this matter:

(a) Newton's first law: If a body be at rest, it will remain at rest; or if in motion, it will move uniformly in a straight line until acted upon by some force.

(b) Newton's second law: If a body be acted on by several forces, it will obey each as if the other did not exist, and this whether the body be at rest or in motion.

(c) Newton's third law: If a force acts to change the state of a body with respect to rest or motion, the body will offer a resistance equal and directly opposite to the force. Or, to every action there is an equal and opposite action.

[20]—What is it that causes the valve of a motor to open?

Force.

[21]—What is force?

It is anything that tends to change the state of a body with respect to rest or motion. If a body is at rest, as when a valve is on its seat, anything that tends to put it in motion is a force. If a body is in motion, as a valve which is being opened, anything which tends to change either its direction or its rate of motion, is a force.

[22]—Why is it that some motors work better than others?

It is very rarely that the principle is at fault. Design, construction, material, and method of use, more frequently have to do with poor result.

Aligning Automobile Wheels

Editor THE AUTOMOBILE:

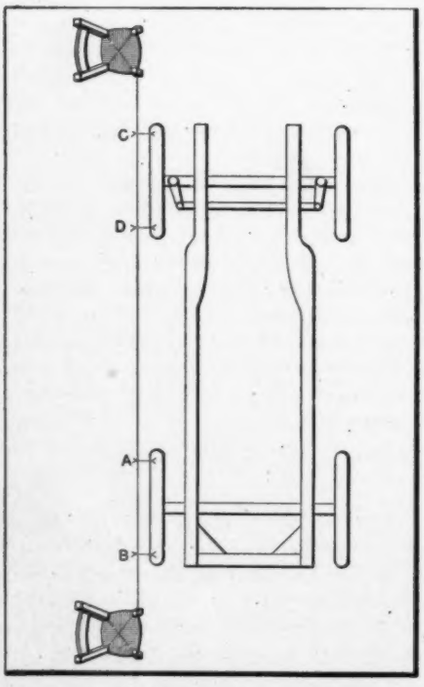
[2,264]—Will you please tell me in your next issue of "The Automobile" the best way to tell if the four wheels of an automobile are in alignment. A. S. GARDNER.

Yazoo City, Miss.

Two drawings are shown on this and the opposite page to show how this is done. First line up the wheels on one side, and then in combination with this line up the wheels on the opposite side. Take the car in any position, in the middle of a flat floor of good area, turn the front wheels as straight as possible. Set a pair of chairs on the floor facing the car, one about two feet in front of the car, and the other perhaps two feet back of it, but both so placed as to be close to an alignment with the side of the wheels, as the figures show. Stretch a string, cord, or wire from one chair to the other, being careful to maintain the same height above the floor at all points. Measure from this string or wire as a datum line to the front and rear parts of the front and rear tires. In case the distance from the front wheel to the datum and that from the rear wheel to the datum line differ, move one end or the other until the two measurements agree exactly. The datum line is then exactly parallel to the line of the wheels on that side.

Now, with a second pair of chairs and a string or wire, repeat the performance on the other side, obtaining another datum line there which is exactly parallel to those two wheels. Having done this, measure across from the one datum line to the other, both at the front, as A, B, and at the rear as C, D, taking care to measure these two at equal distances from the wheels, that is, the distance D H should equal the distance in front at B E.

Should these two measurements agree exactly, the wheels are in alignment, but should one measurement be longer than the other, they are not and a correction should be made. It is well to check up the squareness of the rear axle with the two lines, at the same time, which may be done by dropping a point from the center of the two hub caps, and drawing a cross line through these two points.



Method of Aligning One Pair of Wheels

Having this cross line, which represents the center line of the rear axle, drop also lines representing the two parallels just found. Then measure the angle of the rear axle line with these. It should be 90 deg.

"Steering Advantageously" Revised

Editor THE AUTOMOBILE:

[2,265]—It may be presumptious on the part of a modest driver of only one season's experience of 6,000 miles to venture to differ from recognized experts such as those who conduct "The Automobile," yet "fools rush in where angels fear to tread" and I dare to be one of those fools. Let me say in preface that I will take with the utmost good nature any criticism from you, and further, if you deem this screed worthy of publication, I request that my name be omitted. I am not ashamed of it, but prefer to remain, like all other great people making incursions into foreign territory, "incognito."

That which has called forth this space-wasting contribution is your comment on page 581 in the issue of March 24 on "Steering Advantageously." I must admit that I have never seen a race, and am therefore arguing from theory and possibly thereby laying myself liable to all sorts of justifiable attacks upon my attitude

As it seems to me, the racing driver and the pleasure driver are not to be classed together.The race driver is operating over a course every foot of which he knows and every turn of which he has negotiated in advance and every known contingency in which he has been able to study and provide for. When the actual race comes the unknown quantity is the presence on the track of his competitors and the complications which may arise therefrom. Under ordinary conditions he has only to keep his car steady on the straight stretches and negotiate the turns under the circumstances which seem to him most advantageous, and except at turns, and not always then, he has little or nothing to do with spark or throttle; both are wide open in the position which will do him the greatest good. Understand, please, that I am not attempting to underrate the skill, nerve and coolheadedness which are required in race driving. No reward of which I can conceive would tempt me to try it.

The pleasure driver faces conditions which are constantly varying. Occasionally he reaches long stretches where he can lie back at ease and assume the race driver's position, and under certain circumstances that position is undoubtedly the best, but in a day's drive of 100 to 125 miles, which is all that any ordinary pleasure driver ought to attempt, he is occupied the greater part of the time in meeting varying conditions of direction, grade, speed and highway surface so far as his own car is concerned, and of the occupancy of the road by other vehicles going in both directions and by the crossing of the road by pedestrians. I have been told on reliable authority that the racing driver shrinks from driving through crowded city streets, preferring to let some other hand take the steering wheel, and I can readily believe the statement. The method of steering which has given me the greatest comfort is that in which both wheels are placed in front of a line across the car at right angles, one hand being very near the front and the other about 45 degrees forward of the cross line, that is, with both hands above the forbidden horizontal center. The left hand grasps the wheel firmly and does the greater part of the work. In cases of emergency it can control the greatest average deflection both ways. With the thumb of the right hand for the spark and the forefinger for the throttle the movements of these two essential levers are easily controlled and the other fingers can grasp the wheel lightly and aid the left hand. In addition the right forearm lies across the wheel, affording a rest to that member. As I noted before, when long, straight stretches are met, both hands can be dropped to the race driver's position, affording a welcome variation.

It should be remembered also that the race driver is not hampered by any considerations of economy of fuel or solicitude for the welfare of his car, points which are ever present with the careful pleasure driver.

It must not be forgotten that this is a matter into which the personal equation enters very largely and that the position which I have found to be the best for a long day's run may not meet the requirements of someone else.

As a former newspaper man of more than twenty years' experience I know the value of time and space; yet there are times when even an old newspaper man becomes prolix—"garrulous," if you choose to put it that way; and this seems to be one of those times. For which I ask your pardon.

Boston. LEIGHTON.

Despite the fact that a racing driver has been over the course on which he is driving and should know it perfectly, the speed at which he is traveling makes his case a parallel one to that of the driver who is traveling over unknown roads but at a very moderate speed, being thus able to stop quickly, whereas the racing driver stops after the accident, sometimes stopping only when heaven is reached. This being the case, the argument above is upset.

Still Starting on the Spark

Editor THE AUTOMOBILE:

[2,266]—I am at present a subscriber to your valuable journal and have been for several years past. I wish to say in regard to Starting on the Spark, letter 2,201, that it is not impossible to remove plugs or open pet cocks, and then start on the spark.

While I readily agree that this cannot be done with any certainty, I have done so on a few occasions. Another test I wish to call your attention to is: Start up the motor, run till it has warmed up a little, open the pet cocks, inject gasoline into the cylinders, and then try starting on the spark. A trial or two will demonstrate this to be a thing that can be done occasionally. Now, as to compression, I realize that it is absolutely necessary to the proper working of a gas engine, but here is a little story along that line. This has to do with a friend and his car. He never drove a car until he purchased a popular priced thirty-horsepower machine last June. You know how a novice usually handles spark and gas; it was true in his case, late spark and open throttle. We all know what this does to valves. Now up to the present date he has covered over six thousand miles without touching a valve. You will agree that they are bound to be leaky; it is impossible that they should be otherwise. Last Wednesday I looked over his car, enriched the mixture, and it now starts on the spark, but his valves will be ground in to-morrow. F. M. GIVENS.

Bayonne, N. J.

No comment on the above letter is necessary, except to state that when it was said that starting on the spark was nearly impossible, the average case was referred to and not the three-times-in-three-years case, or anything of that sort.

Blower Pressure and Strong Metals

Editor THE AUTOMOBILE:

[2,267]—Please answer the two following questions, both of which have reference indirectly to a new type of automobile engine that I am building: About what pressure can be obtained from two fans 18 inches diameter, similar to the kind used on automobile engines, attached to the same shaft, each one enclosed in a separate casing, but the first drawing from the open air, while the second draws from the outlet of the first, the two fans being driven at the same speed? What strong metals will withstand a very high temperature, say 400 to 1,000 deg. C.?

New York City. M. E. M.

A fan two feet in diameter (24 in.), will, at 600 revolutions per minute, deliver about 5,000 cubic feet of air per minute. This velocity is approximately equal to a pressure of 1 oz. per sq. in. As the first fan would deliver the air at this pressure to the second fan, the latter may be expected to raise the pressure starting from that point in about the same ratio, namely about 60 to 1. This would give a resulting pressure at the outlet of the second fan under favorable conditions of about 60 oz. or roughly 4 lbs. It must be remembered in this connection that this is a matter in which even experts sidestep direct figures.

Steel is a strong metal, so too, is manganese bronze, and in a relative sense, cast iron. All of these will withstand the temperature mentioned.

Horsepower Formula Once More

Editor THE AUTOMOBILE:

[2,268]—Please answer me through your question box, giving the formula used at the present time, that is, the generally accepted one, for figuring the horsepower of gasoline automobile engines. LOYD H. JORDAN.

Gordon, Neb.

That formula known as the R. A. C. or A. L. A. M. is now in general use. It is:

$$\text{Power} = \frac{D^2 N}{2.5}$$

this rendered into words is the square of the cylinder bore times the number of cylinders, divided by 2 1-2. Apparently it does not consider the stroke, but it is based upon a piston speed of 1,000 ft. per minute, so that longer strokes would yield the same amount of power but at a slower speed, according to it. This latter point has caused much confusion in the use of the formula.

Cranes Made in New Jersey

Editor THE AUTOMOBILE:

[2,269]—In "Letters Interesting" could you give me some information about a car called the Crane, made at Bayonne, N. J.? I have looked in vain through recent issues of "The Automobile" and "Motor Age" for a description of this car, and as it appears to be a first-class machine, I would like to know something about it. J. J. IDE.

New York City.

Unfortunately, this car has never been called to the attention of THE AUTOMOBILE previous to this, and so we have no information whatever about it. Any of our readers who have may send in such information, and THE AUTOMOBILE will be glad to publish it.

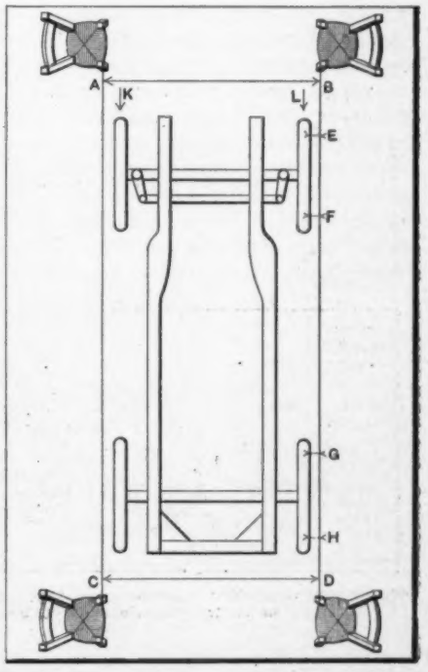
New Engine for an Oldtimer

Editor THE AUTOMOBILE:

[2,270]—I have a little car with a cone-cylinder engine of 3 1-2-inch bore and 3-inch stroke. It has 28-inch wheels, and is geared down 3 to 1, so that 3 turns of the crankshaft give one of the rear wheels. The engine is four-cycle and air-cooled. Could I put in it a new engine with two-cylinder 4-inch bore and 4-inch stroke, air cooled, and get good results? My car is a Crestmobile, model D, shaft drive. The firm making this car originally is now out of business, having failed. WILLIAM P. GILMAN.

Franklin, Pa.

Unfortunately, not enough detail about the construction of the car is given to enable one to state intelligently whether the new engine would go into place or not. If this can be proven to the owner's satisfaction, doubtless the extra power from the larger engine would not be sufficient to do any damage, that is, if the engine can be put into the old chassis, the transmission parts back to the rear wheels will doubtless carry the additional load in a proper manner. A single thought in this connection is that the new engine would require more fuel in any given length of time, this meaning new gasoline tank of large capacity, while the engine itself and all of its accessories will add weight. The result may be to add more weight than the small tires will carry. This should be looked into very carefully before making the change as tire depreciation and repair form a very large part of the motorist's weekly bill, and not the most pleasant part.



Completing the Alignment of all Wheels

Some Leading Magneto Details

By HERBERT L. TOWLE

IN last week's article were explained the principles of action of the three leading types of geared magnetos, i. e., low tension, low tension with separate coil, and high tension, properly so called.

Before taking up the different commercial types of magnetos it will be best to present the above mentioned classes in simplified form. By this means the different details of armature, interrupter, distributor, etc., will be more easy to understand.

In Fig. 1 is shown a typical H armature core, together with the bronze heads, *B B'*, which are screwed to it, and the shaft ends *A A'*, driven and riveted into the bronze heads. As the shaft is not continuous, the open spaces *C C'*, at the ends of the core are available for the coil windings. It will be seen that the core is not a solid casting; rather it is a pair of castings between which is clamped a group of soft iron stampings *D* having the form shown in the detail sketch. The object of thus laminating the core, as it is called, is to retard the circulation of "eddy currents" in the core due to induction. The same forces of induction which are at play in the windings operate also in the iron core itself, and if unchecked would both consume power and heat the armature unduly. As the voltage of these currents is very low, even the slight obstruction of the laminations is sufficient to retard them.

The bronze plates *B B'*, are not intended to be disturbed outside the factory. This is essential, as such disturbance would probably result in breaking the wire leading from the coil through the hollow shaft *A* to its outer end. It would also be likely to result in the shaft ends not being perfectly aligned when reassembled. Owing to the extreme care that must be taken, first in insulating the core, then in winding it, then in baking the coil to expel extra moisture from the insulation, and finally shellacking it to make it permanently watertight, it is essential that the work shall not subsequently be touched by unskilled hands.

Fig. 2 shows how the low-tension armature of Fig. 1 appears when completed and in place. The coil windings are bound around with brass wires laid in grooves in the core to prevent the coil from expanding from centrifugal force and striking the pole pieces. Before the necessity for this precaution was fully understood it was not unheard-of for armatures to "burst" or "swell," with the result of tearing or chafing away the outer wires of the coil, which of course put the magneto out of service till repaired. The inner end of the coil (not shown), is connected permanently to the iron core. The outer end is led, heavily insulated, through the hollow shaft to an insulated steel or copper button at its end, against which bears an insulated hardened steel button under the pressure of a spring. The mounting containing the steel button or collector is insulated from the rest of the magneto, and a binding post on it affords connection for a wire which carries the current to the bus bar on the engine. The ground connection to the switch is attached either here or to the bus bar. Closing the switch, it will be remembered, short-circuits the armature by giving its current a direct path to "ground," i. e., to the engine and magneto frame, through which it returns to the inner terminal of the coil.

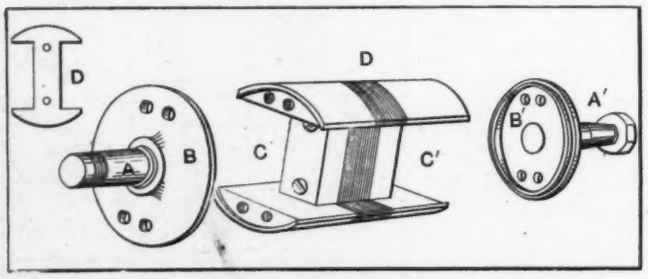


Fig. 1—Typical H armature core together with bronze heads so contrived as to prevent short-circuiting the magnetic circuit

The ball bearings in which the shaft runs are supported in bronze plates screwed to the pole pieces. An aluminum or bronze plate closes in the bottom, and a cover plate over the armature between the pole pieces protects the armature from dust. The driving end of the shaft is tapered to receive a pinion, and the latter is jammd home on the taper by a nut, and usually keyed as well. The ball bearings are oiled about once a month. Other care is seldom if ever required. Before ball bearings were adopted it was customary to use plain bearings, which required frequent oiling, and sooner or later wore so loose as to permit the armature to strike the pole pieces. With ball bearings the clearance may be reduced to a few thousandths of an inch without danger of striking, thereby minimizing resistance to the lines of force.

The average magneto user, it may be remarked in passing, does not realize the importance of giving the lines of force of the field magnets an easy path. It is well known that a common horse-shoe magnet becomes weaker if deprived of its "keeper." The same applies with even more force to the magneto. It is not even desirable to run a magneto with the armature circuit open, and this is one reason for short-circuiting the armature to interrupt the spark. When the armature is in position it affords a good path for the lines of force. If, however, it should ever be necessary to take out the armature for the purpose of repairing, this must never be done until a substantial plate of soft iron has been laid on top of the pole pieces; and the plate must not be removed till the armature has been re-inserted.

The magnetizing of the field magnets is an intricate problem, not so much to render them strongly magnetic for a time as to persuade them to retain their magnetism indefinitely. Certain steels refuse altogether to come up to the proper standard in this regard, and in fact most of the successful field magnets now used are made in Europe from foreign steel. When they come to this country they are "aged" to determine whether or not they hold their strength. If not, and if re-magnetizing does not cure the trouble, they are rejected.

Turning now to the second type of geared magneto, namely, the low tension type with separate coil, we find it a little more complicated than that shown in Fig. 2. It will be recalled that in this type the armature is short-circuted just before the spark is desired, and that breaking the armature short-circuit causes an extra current to flow through the primary winding of the induction coil. This winding has a high resistance in order to compel the bulk of the armature current to flow through the short-circuit till the latter is broken. In addition to the elements shown in Fig. 2 two others are necessary, namely, a mechanical interrupter for short-circuiting the armature at the proper time, and a high tension distributor whereby the secondary current from the coil is delivered to the spark plugs in order. The distributor for a 4-cycle engine is driven from the armature by gearing with two to one reduction.

The interrupter is simply a device for making and breaking the armature circuit, once for each explosion or twice per revolution. Interrupters are of numerous forms, but in all of them a pivoted lever carries a platinum contact point normally abutting against a platinum-tipped screw, and a moving cam striking the lever causes it to break contact. Frequently the cam is stationary, and the lever with its mounting revolves with the armature. The contact screw is insulated and current is led to it by an insulated screw or other conductor through the armature shaft.

One form of interrupter is shown in Figs. 3 and 4, the latter giving an end view of it with the cover plate removed. The cams are stationary and the interrupter mounting, called the

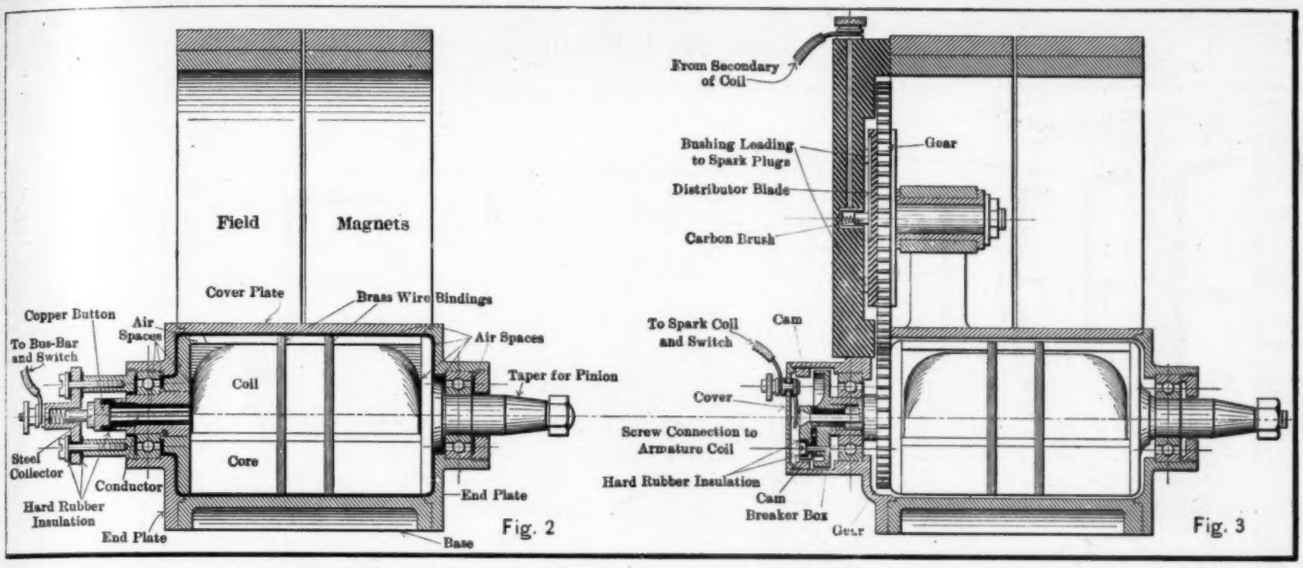


Fig. 2—Section of a simple form of low-tension magneto as used in conjunction with a high-tension coil. Fig. 3—Section of a geared type of magneto with means for short-circuiting just before the current is delivered

"breaker box," is attached to the armature shaft. A spring holds the platinum points normally in contact, and they are separated when the small end of the lever runs over the cams. An insulated spring contact leads the momentary extra current to the primary winding of the outside spark coil, the other terminal of the coil being grounded. To cut off the spark the coil is short-circuited.

In the distributor shown in Fig. 3, the high tension current is led to the top binding post and thence to the central carbin brush, which bears against a radial brass strip, called the distributor blade, embedded in the hard rubber disc attached to the large distributor gear. This blade runs in order under four other carbon brushes spaced equally around a circle and leading current to the spark plugs through connections not shown.

We next come to the high tension magneto, Fig. 4. It has the same form of armature, field magnets, and interrupter, as that in Fig. 3. The distributor may also be similar, though that shown is a little different for the sake merely of illustrating another type. The armature coil of course is different, having a small primary winding with a heavy secondary winding outside of it.

The high tension magneto contains two new features, namely, the condenser and the high tension collector ring. The condenser is usually, though not necessarily, located on the armature shaft in order to get it as close to the interrupter as possible, and it is there shown in Fig. 4. In some magnetos, for the sake of greater accessibility and other reasons, the condenser is located outside the armature in a stationary sealed box.

The high tension collector ring performs for the high tension current the same function that the copper button at the end of the armature shaft in Fig. 2 does for a low tension current. That is to say, it permits the high tension current to be taken off and led to the distributor. The collector ring is of hard rubber with a brass ferrule surrounding it, against which ferrule a heavily insulated stationary carbon pencil bears. The hard rubber spool has wide flanges for the purpose of preventing the high tension current from escaping, by giving it a long path to travel from the brass contact ring to the shaft. As hard rubber is much more resistant than air the current tends to travel over the surface of the spool instead of striking through it. From the carbon collector brush the current is led through a suitable conductor to the center of the rotating portion of the distributor—in this case through a spring and a carbon pencil projecting from the distributor shaft, which is hard rubber with a metal sleeve over it for bearing purposes. Instead of the flat distributor blade of Fig. 3 we have a carbon distributor brush pressed radially outward by a spring and running against the inner surface of a hard rubber ring, in which are inlaid the contact segments from which the current goes through suitable terminals to the spark plugs.

A feature of high tension distributors, which is not shown in these drawings, is the safety spark gap. This is a spark gap between insulated metal points, one in the high tension circuit, and the other grounded. If for any reason the high tension current should exceed the safe voltage (e. g., if the spark plug cables were to be disconnected), the spark would jump the safety gap and thereby prevent the secondary voltage from becoming so high as to endanger the insulation of the coil. The distance of the gap is about one-quarter inch.

Although the illustrations herewith show the essential elements of the three principal types of geared magnetos, they must not be taken to show actual construction very closely. Numerous details making for better insulation, protection against oil, water and dirt, ready accessibility, etc., have purposely been omitted in order to make the drawings so simple as to be easily understood. In a later article will be given illustrations of actual commercial magnetos. By comparing these future illustrations with those given herewith, the reader will be able to identify the various parts without much difficulty.

In order to be able to follow the trend of the articles as they will discuss magnetos of the various commercial forms, it will be desirable to study this article, and thereby become accustomed to the methods of connecting up, as well as the reasons for doing so in the several ways talked about.

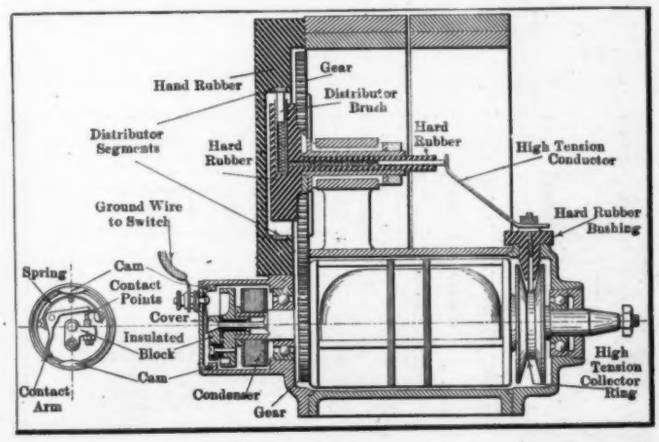


Fig. 4—Section of a high-tension form of magneto with connections in conformity with accepted practice

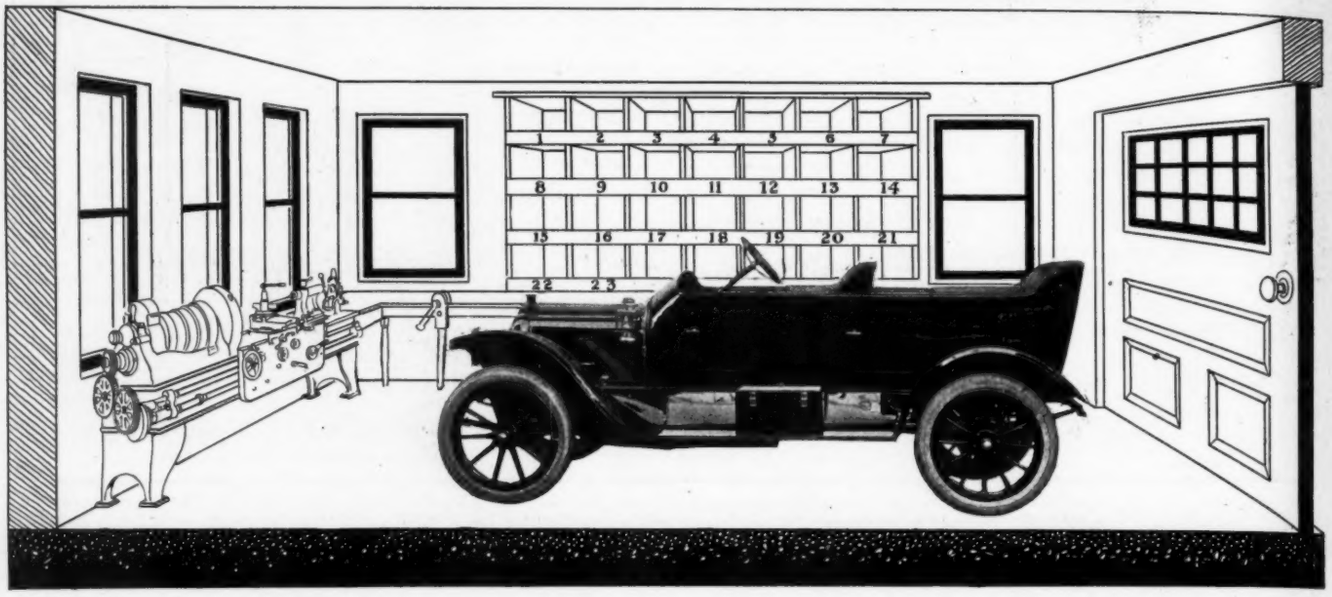


Fig. 1—Length of garage in proportion to the length of the automobile, indicating facilities accompanying ample space

Important Construction Details of Garages

ROOM is desirable for reasons entirely outside of the lighting consideration, and Fig. 1 is offered as a fair illustration of the conditions which should obtain in a private garage. This figure shows the length of the garage in comparison with the length of the car as about in the ratio of 2 to 1. It is impossible to expect to be able to keep a car in good working order if it is so cramped for want of space that work cannot be done upon it excepting under conditions which retard effort, and defeat the use of proper tools.

With sufficient space, good lighting, and certain tools, it is possible to maintain a car in good working order at small cost. There are many little things which happen in the everyday effort of running an automobile that will lead to a large outlay if they are not given the attention they deserve. It will not be necessary at this time to enumerate the tool equipment which might be advantageously employed even in a single-car garage, but it should be remembered that enough space ought to be afforded when the building is planned, so that a lathe and a drill press may be added at any time. In this example (Fig. 1) the lathe is shown at the end opposite the entrance, and since the building is in section, it will be fair to assume that there would be ample room for a drill press and a light forge in the portion of the space not here given. The same illustration presents evidences of a work bench, and what is equally to the point, a shelving system with numbered pockets, so that the parts which might be carried in stock may be kept therein, and a record may be made of the pockets in which the parts are stored, so that when the occasion requires they may be found without much trouble. Leaving the question of the tool equipment as one to be dealt with separately, this illustration will suffice for the intended purpose, but it may not be sufficient to convince the new owner of the fact that he will need more room than that occupied by the car. The usual way is to build the garage first and thereafter discover that room is at a premium.

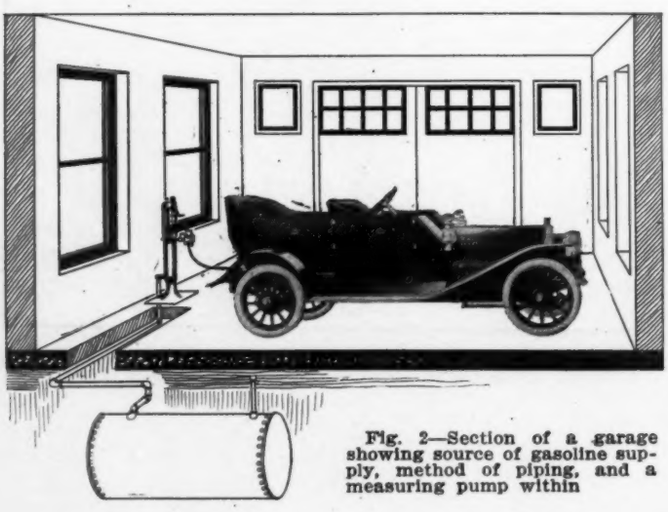


Fig. 2—Section of a garage showing source of gasoline supply, method of piping, and a measuring pump within

Gasoline Should Be Purchased in Quantity and Stored

The fuel problem in the isolated private garage is a particularly difficult one to handle; it would seem not at all difficult to ring up the nearby store at any time and order 10 gallons of gasoline; the boy ought to bring it around in a few minutes. The trouble with this plan lies in the fact that he will not be there on Sunday morning, and the gasoline problem will become a serious one. It may take two or three hours to find a place, and so much time wasted on a fine morning when one desires to go for a ride, seems much longer.

If it may be taken for granted that the hand-to-mouth method of obtaining gasoline is not a good one on the ground that it has its decided uncertainties, even so, the Board of Fire Underwriters will object to the presence of more than 10 gallons of gasoline in a garage, unless provision is made for its proper storage. It will also be remembered that the cost increases substantially 50 per cent. when the fuel is purchased in 10-gallon packages, instead of by the barrel; then too, it is a better grade of fuel as a rule which comes in the original barrel.

Fig. 2 is offered as an indication of the customary manner of disposing of the fuel problem, in which a galvanized steel fuel tank is buried outside of the building line of the garage, and a supply pipe is led from the tank to a measuring pump, which may be placed at any convenient point within the building proper, with the understanding, however, that the pump should be free from leaks, so that gasoline will not be spilled about, or it should be placed in a suitably contrived fireproof closet with proper means of ventilation. All these details, in any event, will best be cared for by consulting the rules and regulations of the Board of Fire Underwriters having jurisdiction, and it will

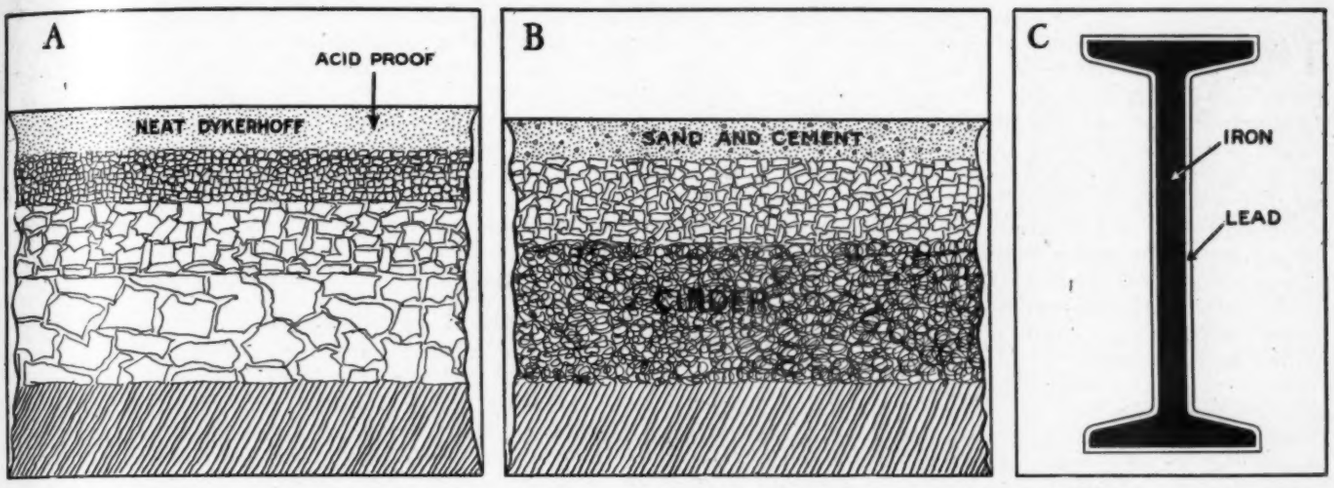


Fig. 3—A presents an acid proof cement floor employing neat Dykerhoff cement for the top layer, and broken granite with Dykerhoff cement beneath. B, cement floor using ordinary cement on a cinder bed when gasoline automobiles are stored. C, lead sheathing over iron work to render it acid proof in an electrical garage

be well to remember that the respective Boards in the several districts do not always agree as to the efficiency of a plan. Money will be saved by consulting the rules and regulations of the Board first, and making the plans in the light of information which may be so obtained.

Cement Floors Are Sources of Possible Annoyance

If a small garage is designed for gasoline automobiles only, the cement floor may be composed of (a) a cinder bed, possibly 6 inches deep; (b) a grout of broken stone, 7 to 1 cement with sand filler, for about 3 inches, topped off by sharp sand cement in the ratio of 1 of cement to 2 of sand, worked to a neat condition for the surface. Such a floor will afford the desired solidity, and will last for a very long time because the oil and other accumulations from a gasoline automobile will work no ill effect. Should the garage be devoted to the storage of an electric automobile, if the battery is of the lead-lead genera, and provided it is to be charged by means of a suitable equipment attached to the garage, there is an excellent opportunity to induce a relatively high depreciation of the floor, in view of the fact that the sulphuric acid electrolyte used in the battery will attack ordinary grades of cement, and if this condition goes on sufficiently, the floor will be destroyed.

To get around trouble of this sort, the plan as indicated in Fig. 3, may be accepted. In this plan, the lower strata is broken granite, coarse at the bottom, and tapered off to sizes which will pass through a one-inch mesh, the whole occupying a depth of say 4 inches. The next layer is made up of broken granite in sizes which will pass a 3-4-inch mesh and is grouted down, using Dykerhoff cement in fine granite screenings for the layer next to the top to a depth of possibly 2 inches, and finally neat Dykerhoff cement to a depth of three-quarters of an inch for the top coat. Fig. 3 shows how iron work may be protected from the corroding effect of acid and its fumes which come from charging the battery; the plan comprises sheathing over the iron work with thin sheet lead. In a small establishment this sort of thing should not be necessary; iron work may be avoided.

If the building is well ventilated the question of the acid action on the surrounding metal will be lessened in any case, but it is necessary to settle a matter of this sort when the structure is being planned.

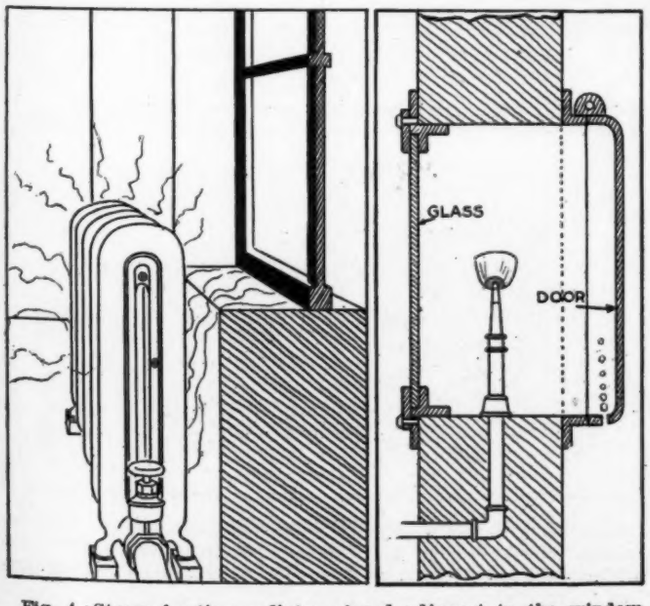


Fig. 4—Steam heating radiator placed adjacent to the window, so that the cold air is heated as it enters. Fig. 5—Lighting pocket located in the wall with a tight glass bull's-eye separating source of light from the gasoline contaminated air within the storage space

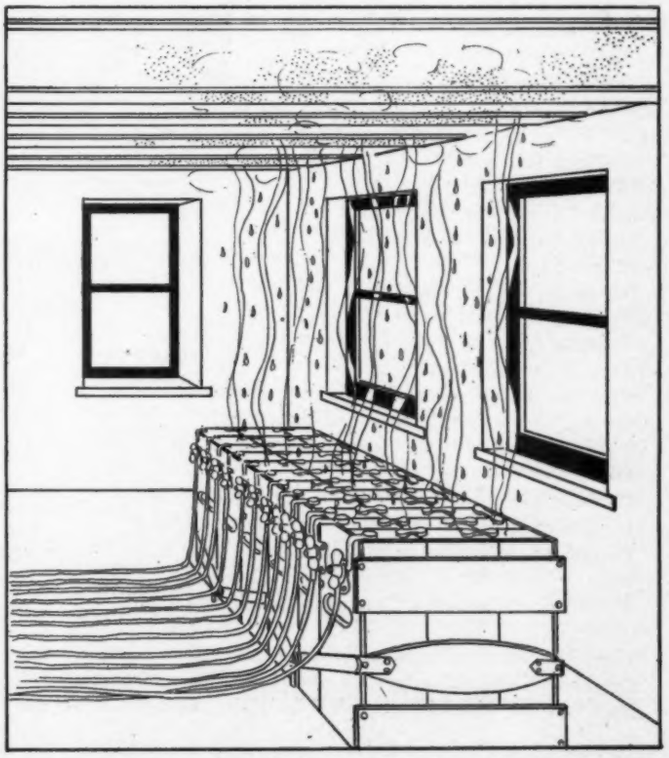


Fig. 6—Shows a storage battery on charge, and the acid fumes given off as the battery nears its complete state of charge, which fumes are corrosive

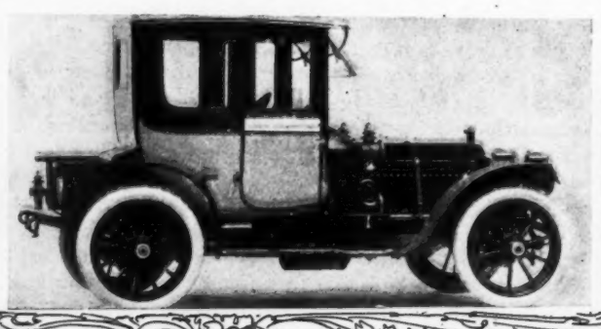
Packard Nineteen

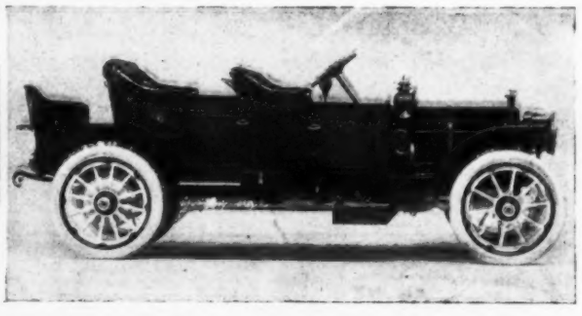
THIS year the new models are being presented a little early, due, perhaps to the briskness of the automobile trade, but quality must be reflected in this same story, on the count that if the automobiles were not good, to sell them would be a relatively difficult matter. At all events the Packard line for 1911 is here and the Packard Motor Car Company, of Detroit, Mich., offers the statement, with its data of the cars, to the effect that the newer body work is a departure from former practice in important particulars, among which the new fore-door style of body is accentuated. Then, it is pointed out that the painting colors are different; Packard blue and cream yellow vies with Packard gray, and a Packard method is also given prominent mention by the company.

The new open cars, instead of having bodies of the "torpedo" type, are made with both the front and rear body panels in strong relief and with victoria carriage lines. These panels are painted Packard blue, striped with Packard gray. The frame, bonnet, fenders and similar parts are black, while the wheels and running gear are Packard gray, striped with black.

Packard from the Mechanical Point of View

The mechanical improvements in the 1911 cars are extensive but are all in the nature of detail refinement, developing previous models. The "Thirty" line and prices are as follows:





Touring car, phaeton or with close-coupled body, in standard finish and equipment, including Packard extension cape cart top, $4,200.

Runabout, in standard finish and equipment, including runabout top, $4,200.

Touring car with leather victoria top, in standard finish and equipment, $4,450.

Phaeton with leather victoria top, in standard finish and equipment, $4,415.

Touring car with full glass canopy top, in standard finish and equipment, $4,645.

Limousine, in standard finish and equipment, $5,450.

Landaulet, in standard finish and equipment, $5,550.

Fore-door limousine, in standard finish and equipment, $5,650.

Fore-door landaulet, in standard finish and equipment, $5,750.

Coupé, in standard finish and equipment, $4,900.

Packard "Eighteen" offers the following choices:

Open car or with close-coupled body, in standard finish and equipment, including a five-ton extension cape cart top, $3,200.

Runabout, in standard finish and equipment, including runabout top, $3,200.

Open car with leather victoria top, in standard finish and equipment, $3,415.

Limousine, in standard finish and equipment, $4,400.

Landaulet, in standard finish and equipment, $4,500.

Fore-door limousine, in standard finish and equipment, $4,600.

Fore-door landaulet, in standard finish and equipment, $4,700.

Coupé, in standard finish and equipment, $3,900.

General Specifications of the Cars

Motor.—Four vertical, water-cooled cylinders, "Thirty," bore, 5 inches; stroke, 5½ inches; 30 brake horsepower at 650 revolutions per minute. The "Eighteen" bore, 4 1/16 inches; stroke, 5⅛ inches; 18 brake horsepower at 650 revolutions per minute.

Wheel base in the "Thirty" standard chassis is 123½ inches; runabout, 108 inches. The "Eighteen" standard chassis is 112 inches; runabout, 102 inches. Tread, 56½ inches.

The "Thirty" tire equipment is, front and rear, 36 by 4½ inches. For the "Eighteen," front and rear, 34 by 4 inches. Continental demountable rims. Flexible bead clincher tires of any of several standard makes.

The painting situation is represented as follows:

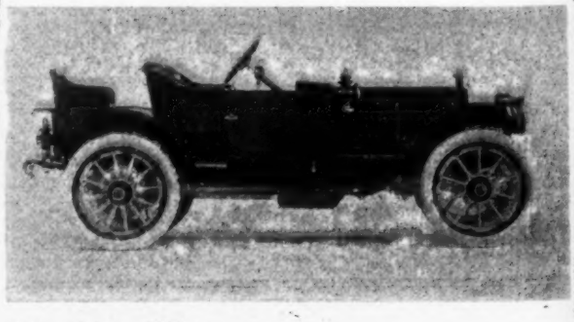
Open cars.—Body and door panels, Packard blue, striped with Packard gray. Under-body, bonnet, radiator, frame, fenders, splashers, battery and tool boxes and moldings, black. Wheels, axles, springs and other running gear parts below the frame, Packard gray, striped with black.

Enclosed Cars.—Body lower and door panels, Packard blue, striped with Packard gray. Upper-body, under-body, bonnet, radiator, frame, fenders, splashers, battery and tool boxes and moldings, black. Wheels, axles, springs and other running gear parts below the frame, black, striped with Packard gray.

In trimming the automobilist has the following choices:

Open cars.—Seats, black, hand-buffed, straight-grain leather, tufted. Running boards and front floor and heel boards, cork carpet. Fiber mat in tonneau.

Enclosed bodies.—Front seats, black, hand-buffed, straight-grain leather, untufted. Front floor and heel boards, cork carpet.



Top—Inside Driven Brougham, on Eighteen Chassis
Middle—Thirty Touring Car with Seven Passenger Body
Bottom—Thirty, Front Door Runabout Body and Chauffeur's Seat

Hundred and Eleven

Rear compartment, below the belt, blue goatskin, tufted; roof and quarters, blue broadcloth, untufted; floor, blue carpet to match.

Standard Car Equipment Furnished

Extension cape cart top, with side curtains, corner light curtains, storm front and envelope on all open cars except runabouts, the equipment of which includes runabout top, with corner light curtains, storm front and envelope. Storm front omitted when corner light curtains are fitted to windshield. Two gas headlights and gas tank, two oil side lamps and oil rear lamp, horn, complete set of tools, with tire repair and rim changing equipment, one extra demountable rim, irons for two extra tires, one-ton jack.

Enclosed body equipment consists of dome light, with switch and battery, toilet cases to match upholstery, push button and buzzer, speaking tube, folding foot rail, hat and parcel carrier, coat hook, adjustable ventilators, morocco-covered robe rail and two umbrella holders in "Thirty" bodies. This equipment is unusually complete even for a car of this type.

The Motor Details

Cylinders are cast in pairs, with integral water jackets and valve chambers. Cylinders and pistons are ground and interchangeable. Pistons are fitted with four rings, ground top, bottom and sides. Cylinders, pistons and rings are lapped together after assembling. Castings for cylinders, pistons, etc., made in the Packard foundries from especially imported gray iron.

Crankshaft has three large main bearings, supported by massive webs. Connecting rods are drop-forged.

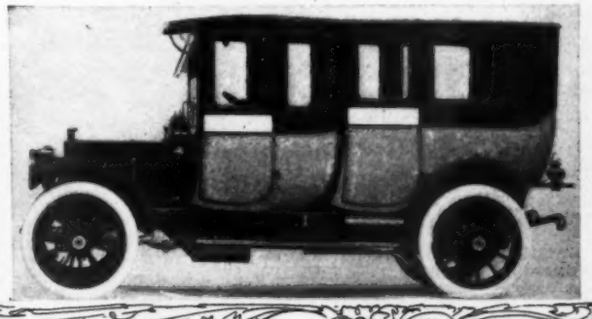
Quiet running is obtained by great rigidity and accuracy in manufacturing and inspection. All bearing surfaces are ground. Bushings are all carefully fitted.

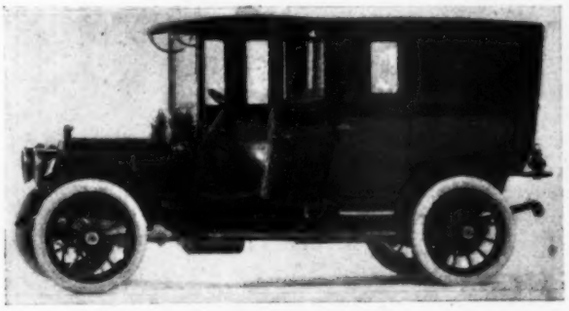
Valves are all mechanically operated and interchangeable. Positively lubricated camshafts are enclosed within crankcase. Inlet and exhaust valves are on opposite sides of the cylinder pairs. Camshaft, magneto and water pump gears are positively lubricated and protected from dirt, being contained in a separate but integrally cast, oil-tight extension of the crankcase. The latter, it will be remembered, is cast in two halves, split horizontally on the center line.

Crankcase has three horizontal sections. Uppermost section is supported by main frame and forms engine base. Crankshaft bearings are held between the uppermost and middle sections. Bottom section is an oil well, easily removable for inspection or adjustment of connecting rods, camshafts and other inside parts without disturbing crankshaft bearings.

Entire crankcase is cast of special aluminum alloy in the Packard foundries. All motor parts are protected by integral web enclosing space between motor and frame. Crankcase is divided into front and rear compartments by a central partition supporting the center crankshaft bearing.

Carburetor is of the firm's own design and manufacture, combining float feed, automatic mixture regulation for all motor speeds and uniform temperature. Primary air intake may be shut off to assist starting in cold weather. It has a water-jacketed cylindrical mixing chamber. Auxiliary air inlet is automatically regulated for varying speed by a spring-controlled poppet valve. Small lever on dashboard governs the poppet-valve spring tension to suit different atmospheric conditions.

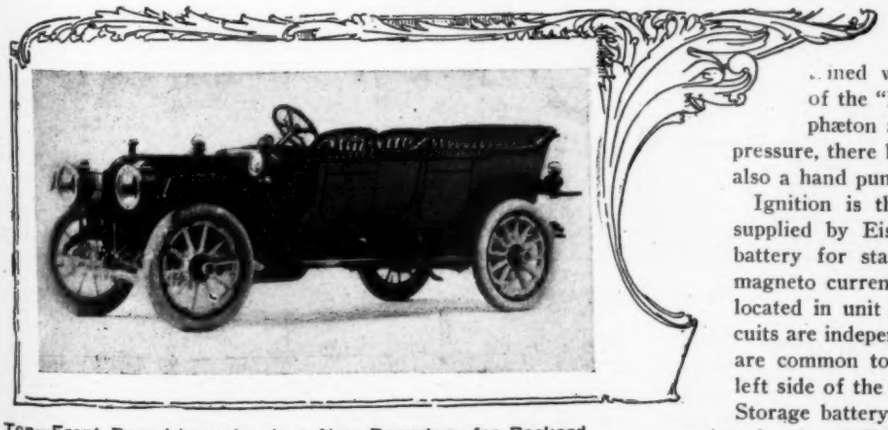




Butterfly throttle is above aspirating nozzle in mixing chambers.

Gasoline supply is by gravity from a copper tank under the front seat, with a three-way gasoline valve which controls the main supply. There is, also, a 5-gallon reserve and shut-off. The capacity of the standard "Thirty" tank, including reserve supply which is contained within main tank, is 21 gallons. Capacity of the "Eighteen" tank is 18 gallons. In runabouts, phæton and close-coupled cars, gasoline feed is by pressure, there being an automatic pump on the engine and also a hand pump for emergency.

Ignition is the jump spark by special system, current supplied by Eisemann low-tension magneto with storage battery for starting and reserve. Transformer coil for magneto current and vibrator coil for battery current are located in unit box on dashboard. Coils and primary circuits are independent but secondary circuits and spark plugs are common to both systems. Magneto is placed on the left side of the motor bed and is driven by enclosed gears. Storage battery is in a box on the running board. Convenient hand and "kick" switch, combined with a Yale lock, is placed between battery and magneto coils. Commutator for the



Top—Front Door Limousine Is a New Departure for Packard
Middle—Front Door Landaulet Has a Distinctive Appearance
Bottom—Touring Car with Torpedo Body Looks Natty and Neat

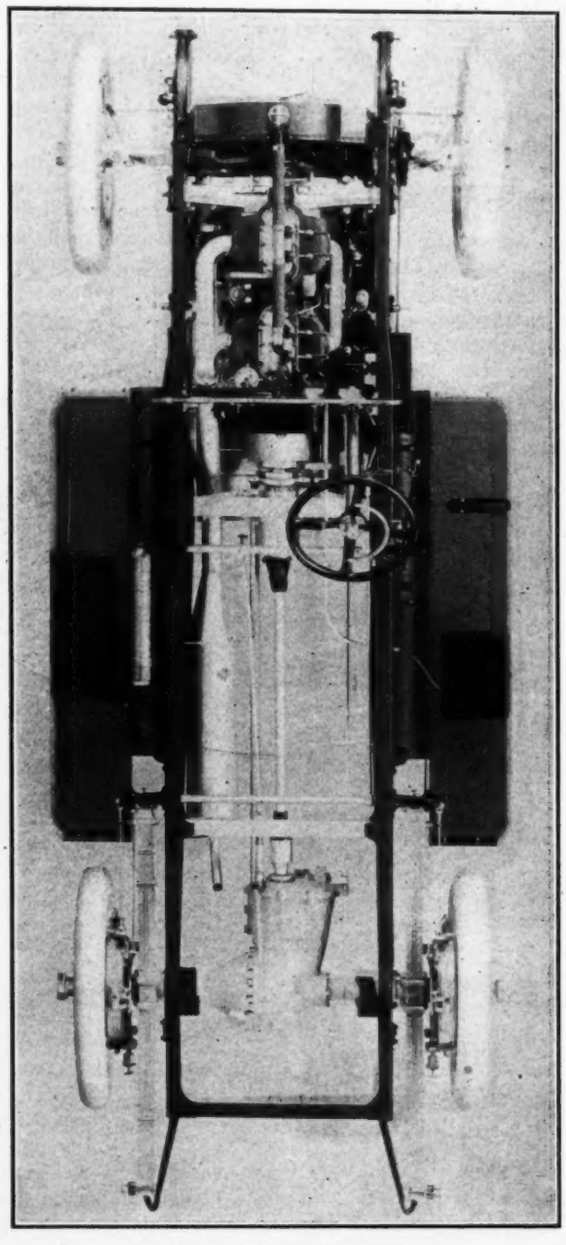
battery primary current is on a vertical shaft at the rear of the motor and is driven from the exhaust valve camshaft by enclosed bevel gears. Primary wiring from battery to coil is carried through protecting tube. Secondary wiring from magneto distributor to universally-jointed knife switches at spark plugs is also satisfactorily carried through a copper pipe.

Lubrication has a number of features, motor being oiled by splash from crankcase to cylinders and all motor bearings. Positive supply of oil flowing independently to front and rear compartments of crank-case by means of a double plunger pump. Oil feed is easily regulated, pump strokes being adjustable. The pump is accessibly located at left of motor and is driven by a worm on the exhaust valve camshaft. An oil reservoir placed between the pairs of cylinders—this location insuring uniform temperature and fluid—gives easily flowing oil, even in cold weather. The capacity of the "Thirty" oil tank is one gallon; "Eighteen," 2½ quarts. Two drip sight-feeds are placed on the dashboard. Anti-clogging devices on crankcase drain cocks and stops to prevent their accidental opening. Transmission and differential are run in oil. All universal joints are encased and packed with grease. Other running and wearing parts are provided with grease cups or oil holes.

Methods of Motor Control

Motor speed is regulated by hand lever on steering wheel and by foot pedal, both acting directly on throttle. Hydraulic governor to steady the motor running and compensate for varying loads within the limits of volitional throttle setting. The pedal provides means of instantaneous acceleration as well as continued high-speed running. The governor is incorporated in the water circulation system, being part of the pump unit. The ignition spark is advanced or retarded for most efficient ignition under every running condition by a small lever on the steering wheel.

Starting crank has an automatic latch which holds starting crank in upright position when not in use. There is a compression relief handle near starting crank.



"Thirty" Chassis from Above

Motor cooling is by positive water circulation through cellular radiator and motor cylinder water jackets by gear-driven centrifugal pump. A nonleaking filler cap is placed on the radiator water tank. A suction strainer on water pump is easily removable for cleaning without breaking any water connections. Belt-driven, ball-bearing fan is provided with an adjustment for belt tension. Capacity of water circulation system in Packard "Thirty" is 5 gallons; in "Eighteen," 4½ gallons.

Unit Principle of Speed Changing Used

Clutch is of the dry plate type, engaging gradually with delicate positive action at all times. Casing plates are faced with special friction material. The shaft plates are of metal.

Unit principle of speed changing is used with the final drive and differential gears contained in rigid rear axle unit. This method has as its advantages few parts, light weight, high efficiency. No transmission elements are on main frame and no intermediate parts require alignment between the clutch and rear axle. A long propeller shaft having minimum angularity is used with effectively encased universal joints at each end.

Speed changing gives three forward speeds and reverse, providing most efficient gear ratios for all kinds of driving, obtained by simple arrangement of sliding gears. Third speed forward is direct drive. Gear shifting lever has selective action in single quadrant. This lever moves forward and backward for forward speeds, and laterally into a notch for reverse. Reverse movement is locked by thumb latch. Gear shifting is assisted by spring locks on the shifter shaft, which determine correct engagement of gears. Gear shifting toggles and other actuating parts are enclosed in gear housing and protected from dirt. Annular ball bearings are used throughout transmission.

Aluminum housing that contains speed changing gears, final drive bevel gears and differential is internally ribbed for strength and rigidity.

Housing provided with oil plugs and inspection holes. Differential gear unit supported by its own bearings, rear axle sections being removable without disturbing gears. Rear axle and final drive and differential gears run on annular ball bearings. Ball end thrust bearings.

There are four brakes, all acting directly on rear-wheel brake drums, thus obviating braking strain on transmission.

Service brakes are external contracting bands, operated by pedal. Emergency brakes are internal expanding segments, operated by hand lever. Internal brakes enclosed and protected by drum disks. Bayonet locks on internal brakes to prevent rattle. All brake operating systems are equalized through toggle levers, with operating pull on one end and direct connection to the brake levers on the other. This

results in an even pull on both brakes, which serves to prevent skidding of the car on many occasions, particularly on wet days.

Running Gear and Chassis

Main frame is a channel section, pressed steel frame, arched above the rear axle to allow liberal spring action in connection with the desirably low body. Top and bottom flanges of side bars have integral gussets for the reception of cross bars, simplifying the construction and increasing the strength.

Steering is by means of a worm and sector steering gear with large hand wheel, entirely wood covered, including spokes near the rim, for comfort.

Worm and sector are forged integrally with their respective shafts. Large, rigid steering column. Heavy drop-forged jaw type yokes on front axle and forged steering knuckle spindles. Ball thrust bearings in steering knuckles. Steering connecting rod ball and socket joints encased. All steering gear bearings and connections directly lubricated by grease cups. Steering connecting rod is above front axle, being in position to minimize transmission of vibration to driver's hands.

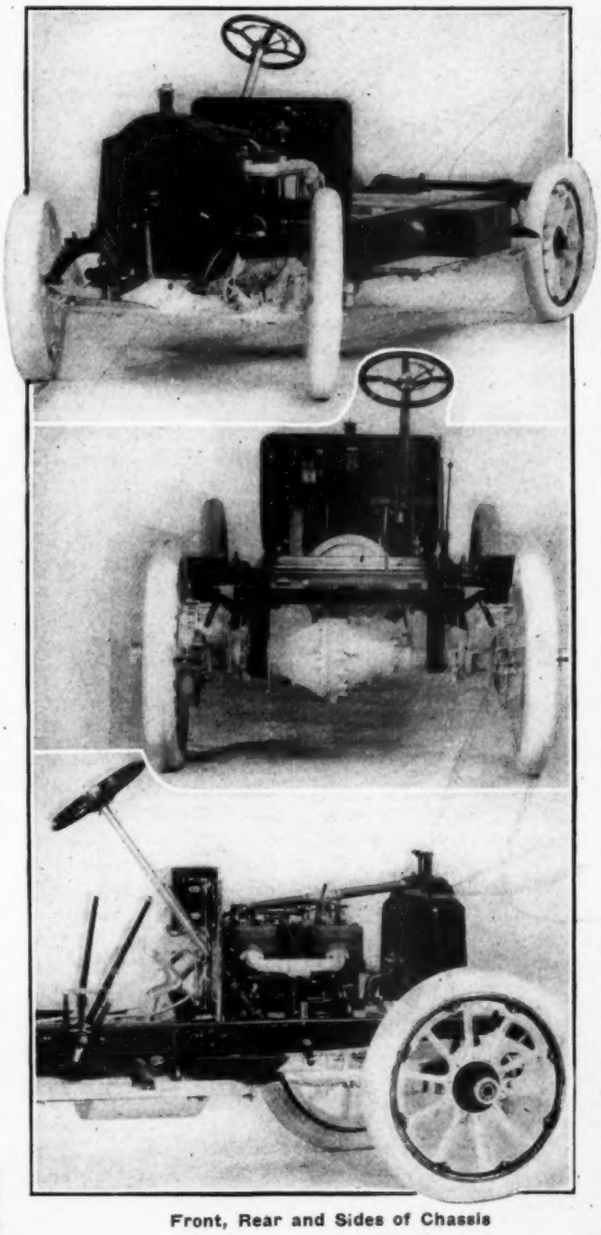
Four wide, semi-elliptical springs carry the load. Rear springs are 56 inches long in the "Thirty," and 50 inches long in "Eighteen." Front springs are 40 inches long in both. Compression grease cups lubricate all spring shackle bearings. Shock absorbers are placed on both front and rear axles.

Front axle and stationary sleeves of rear axle are of steel tubing of large diameter and heavy gauge. Rear axle tubes are pressed into and riveted within flanged collars bolted to the aluminum differential gear housing. Roller bearings in front wheels.

Body construction is of sheet aluminum panels over wood framework. Bonnet is of aluminum and secured against rattling. Fenders, aluminum, flanged for rigidity. Splash aprons between front fenders and car. Rear fenders so attached to body as to be practically water-tight. Splash aprons between frame and running boards.

On this and the opposite pages are shown a plan view of the chassis, and front, rear, and side views as well. From these some idea of the construction of the car may be gained by anyone, whether familiar with Packard construction or not. In this connection, the brakes just mentioned, for instance, will be found to be practically the same as last year, at which time attention was called to the fact that all brakes were located on the rear hubs, thus avoiding any pull of the gears ahead of this, or any braking through the transmission, as it entailed by the use of a shaft brake.

So, too, with the steering gear, this was brought out last year for the first time with grease cups to supply the internal lubrication, which practice is now continued, a year's usage having developed no defects in it. Speaking of the steering gear, the spindles and jawtype yokes are drop forged. The connecting rod, between the knuckles and the steering column, is placed above the front axle in a manner which minimizes stresses, vibrations, and consequent jar on the driver's hands.

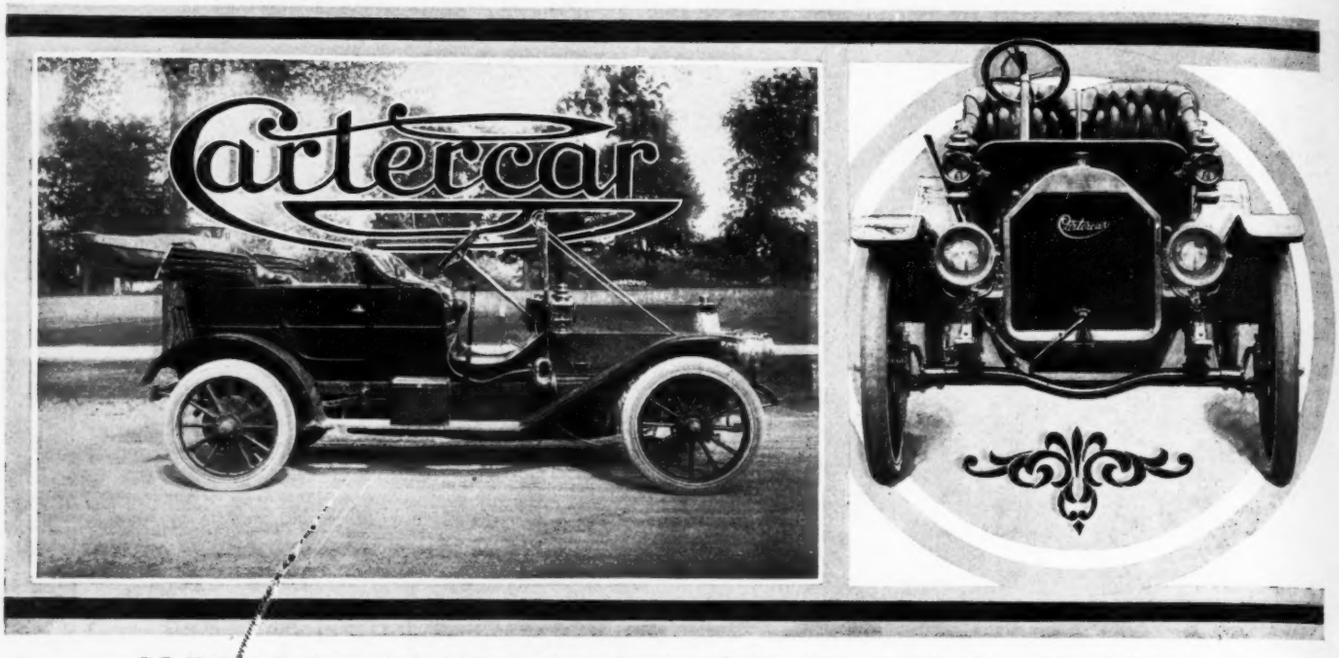


Front, Rear and Sides of Chassis

Last year, when the dry-disc clutch was brought out for the first time, there was, perhaps, a slight doubt as to whether this was the perfect form of clutch for Packard cars, but after a season, it is again announced as the type to be utilized, proving that the move was in the right direction. This clutch is described as of the dry-disc type, that is, it is a disc or plate clutch so designed as to run perfectly without lubrication, the absence of the latter giving it the designation, dry. This clutch affords the desirable feature of gradual engagement, and, as it operates without lubrication of any kind, provides the same action in cold as in warm weather. By the use of a special lining material, the clutch will not burn.

Effective Lubrication

Lubrication is a decidedly interesting subject, if for no other reason than from the fact that delicate machinery can not be run, at least not successfully, without some form of lubrication. In this copious lubrication is far better than a scanty supply, so the decision to use the combined pump and splash system is a wise one, for this double system has the merit of supplying not only continuous flow of oil to all bearings, but to the fact that it is also an economical one, the same oil being filtered and used over and over again. As to details, the splash lubrication system is the same simple, positive system formerly used. A double plunger oil pump feeds the front and rear compartments of the crankcase, in which are independent oil levels. The oil pump strokes being adjustable, the oil feed is easily regulated. The pump is accessibly located at the left of the motor and is driven by a worm on the exhaust valve camshaft. Oil is taken from a vertical copper reservoir close to and between the pairs of cylinders, this location insuring uniform temperature and fluid, easily-flowing oil, even in the coldest weather. The capacity of the oil tank of the "Thirty" is one gallon. There are two drip sight feeds on the dashboard.



Model L Cartercar, Made by the Cartercar Company, Pontiac, Mich., in Both Side and Front Views

SPECIFICATIONS OF THE CARTERCAR, CARTERCAR COMPANY, PONTIAC, MICH.

Motor, four vertical cylinders.
Bore, 4¼-inch.
Stroke, 4½-inch.
Cylinders, pairs, and offset.
Valves, all on right side.
Finish, all engine parts ground.
Power, 30-35-horsepower.
Cooling, by centrifugal pump, direct-driven.
Radiator, flat tube.
Lubrication, combined pump and splash.
Ignition, dual jump spark, magneto and batteries.
Transmission, Carter patented friction drive.
Final drive, single chain in oil.
Frame, pressed steel, of channel section.
Springs, semi-elliptic, 52-inch rear, 46-inch front.
Wheelbase, 110 inches.
Tread, standard
Axles, front tubular, rear live.
Wheels, twelve spoke artillery.
Tires, 34 by 4 quick detachable.
Brakes, internal expanding hub brakes and friction reverse.
Steering, irreversible worm and sector.
Steering wheel, 16-inch, with spark and throttle levers.
Body, straight line design.
Colors, three options—Brewster green, Cartercar red, or combination.
Upholstery, black leather, dull finish.
Equipment, magneto, two gas lamps, generator, horn, mats, complete set tools, jack, tire repair outfit, etc.
Price, $1,600 f. o. b. Pontiac.

FRICTION driving being the central idea about which the Cartercar is constructed, it will be well to give that part of the whole chassis greater prominence. Since this replaces both the transmission and clutch of the ordinary case, it will at least be fair to devote as much space to it as would ordinarily be given to those two very important parts of the automobile mechanisms.

This drive and the name of the car are both due to Byron J. Carter, now dead, but who, in 1901, designed and built the first friction-driven car. This progenitor of the modern and up-to-date Cartercar was still in use up to two years ago, in Ann Arbor, Mich., when the company purchased it for exhibition purposes. So well and wisely did Carter construct his first vehicle that the cars to-day show little variation from the original design, aside from the natural progress which the industry as a whole has showed in the nine years, and smaller refinements added to make it a more comfortable and better looking machine.

Two models are made and sold to-day, known by the trade names of Model L and Model H. Barring such slight differences in the chassis as the larger size of one motor makes, the two are identical, one being made to sell at $1,150, while the higher powered Model L sells at $1,600. For this reason only the larger model will be described in detail.

The motor of this machine is of the usual four-cylinder type, water-cooled, with cylinders cast in pairs. The cylinders are of the L-head type, with all valves on one side, this being the right-hand side of the machine. The cylinders are cast from a close-grained run of gray iron, and are first roughed out in the lathe, seasoned, then ground to size, using micrometer gauges. Pistons, too, are of gray iron, and ground to size, both top, bottom and sides. The bore is 4¼ inches, and the stroke 4½ inches, resulting in a power output of 30-35. The valves used are of the best quality steel, with electrically welded heads, a form which experience has proven very successful. The three-bearing crankshaft is of a selected grade of open-hearth steel, machined and ground to size, the pins being very carefully ground after hardening. Rigid specifications in the drop-forging process insure a good class of material and fair workmanship in this very important part of the engine. In assembling much pains is taken with the camshaft and crankshaft location and alignment, special jigs being used for this purpose. The crankshaft bearings are plain, but of fine material, which, aided by the careful assembling process, results in a very low loss through internal friction.

Following the assembling, the work is proven true by a long run-in test, after which the motor is inspected. It is then, after passing inspection, tested out on the test-block, when the actual power delivered is measured. The final result is a motor of ample power, high and very low speeds, and one that runs quietly and well at all times, and answers the throttle readily. Lastly, the engine is thoroughly tested out when the whole car has been assembled and is ready for the road, the engine doing the bulk of the work on this tryout.

As to disposition of the accessories, it will be noted in the cuts of the engine on the opposite page that the inlet pipe is led downward from the ports in the cylinders, thus giving it a very simple and symmetrical form, while at the same time making it unusually accessible. The exhaust pipe, on the other hand, is carried up above the ports, this also resulting in simplification. Since heat is disastrous to magnetos and other forms of ignition apparatus, the magneto is located on the opposite side of the engine to the valves and pipes. It is driven from the gear compartment in front, through a side shaft, which also drives the water pump, the latter in fact being forward of the magneto. The former as well as the latter may be disconnected at will and taken out, without disturbing the other parts. This desirable result is accomplished through the medium

of universal couplings in the driving shaft, which permit the taking out or replacement of either one of these accessories.

Cooling is made effective, regardless of the heat encountered by this pump, which is of the centrifugal type, gear-driven, as just described, very liberal water-jackets on the engine, a large flat tube, cellular type of radiator, with a fan as an auxiliary. The radiators are of the first grade of flat copper tubes, designed to present the greatest surface to the cooling action of the air, which action is assisted by the rapidly revolving fan located just back of the radiator, and belt-driven off of the crankshaft. An eccentric hanging provides a means of taking up any slack of the belt, which change is effected through the loosening of a single bolt, making the change, and tightening the bolt again.

Crankcase is cast in two parts, an upper and a lower. The upper carries the crankshaft bearings, as well as the supporting arms and the pads for the various accessories, while the lower acts as an oil reservoir and dust extruder. The lubrication system is a combination of the splash and the forced circulating methods. For the splash system, the lower half of the crankcase is kept half filled with oil, in which the connecting rods dip on each revolution, at the lowest point in the cycle, thus splashing the oil around the inside of the motor in the form of a mist, which lubricates everything therein very thoroughly. This oil level is a fixed one, and is maintained by the oil-circulating pump, which is gear-driven off of the camshaft.

Ignition is by dual systems, a low-tension magneto, previously spoken of, which furnishes current to a single, non-vibrating dashboard coil, the voltage being raised there to a sufficient amount to bridge the usual spark gaps, the final spark being of the jump variety. In addition to this jump-spark magneto system, an auxiliary battery is carried in a battery box on the running board, this working through the same dashboard coil, and a timer carried on the rear end of the camshaft.

A carbureter of the central float type is carried low down on the valve side of the engine, the low position assuring the use of every drop of fuel available, and insuring positive fuel feed on steep hills. This carbureter, like the other components of the car, is very simple, being made with a single setting, which makes the device self-adjusting after setting.

Coming next to the friction drive, which makes for higher power at the road wheels, simpler control, fewer parts, and easier operation, there is a driver, so called, which transmits the power of the engine to the friction disc, from which the drive is by means of a chain enclosed and running in oil, back to the rear axle. This transmission driver consists of a cross member keyed rigidly to the forward end of the disc shaft, and to which are secured two flat tempered steel plates, the opposite ends of which are bolted to the flywheel itself. The rotation of the flywheel exerts a straight pull on these plates, thus rotating the disc, and at the same time the disc and shaft are free to slide forward and back along the disc shaft, thus allowing the changes in the speed of the car, differing positions giving different speed ratios. It will readily be seen that the disc shaft is by this means made an integral part of the crankshaft, in so far as rotary motion is concerned, although the two happen to be made for manufacturing convenience in separate parts, and entirely independent as to forward and backward movement.

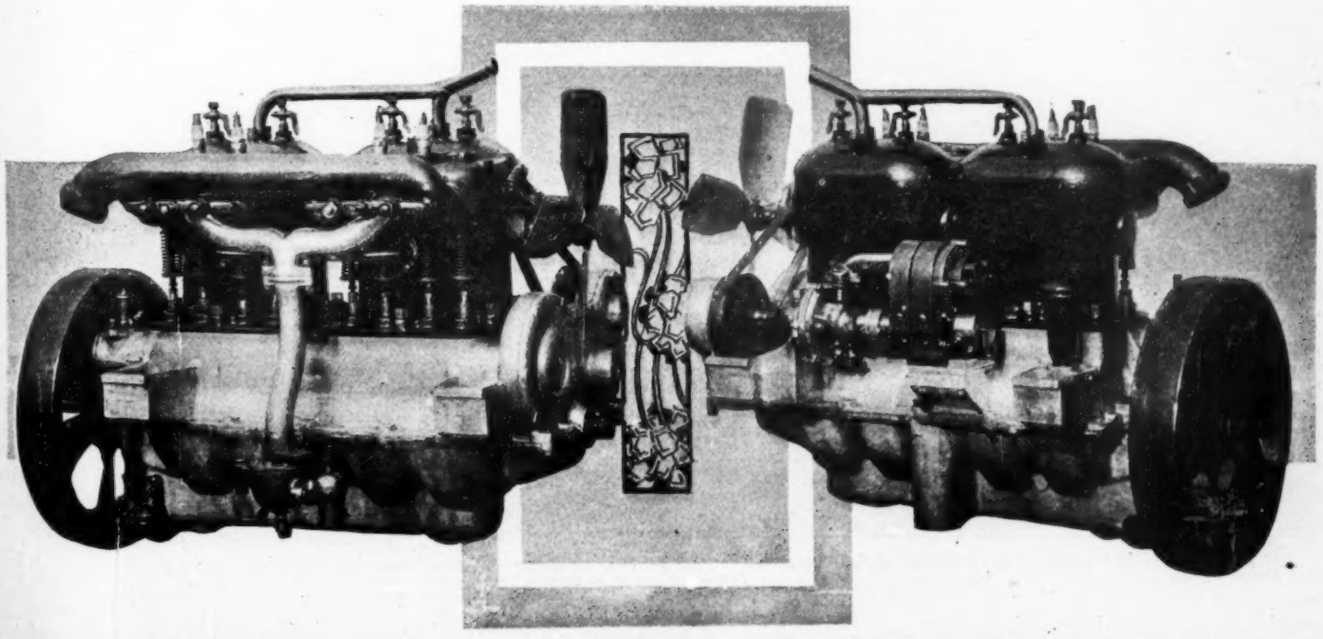
To reduce the frictional losses to an absolute minimum, the transmission shafts are mounted upon high-duty ball bearings of large size, great strength, and thus, high capacity.

The thrust bearing of the disc shaft is carried in a hanger immediately in front of the disc, and is of the four-point type, with balls of large size. This bearing is of special design and construction, and the ball races are of the finest tool steel, accurately machined, hardened and ground to micrometer gauge true to a half thousandth of an inch. This four-point type of bearing is the nearest possible approach to entire absence of fraction, owing to the fact that the periphery of the balls' travel is always exactly perpendicular to their axes of rotation, and thus there is no tendency to jam.

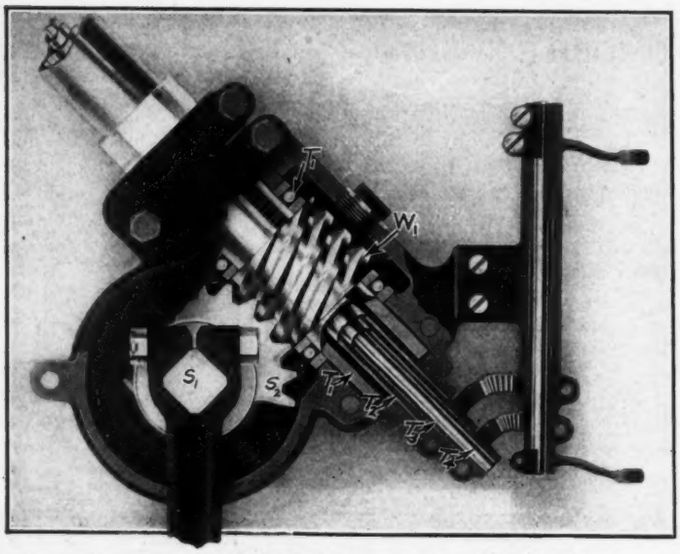
To return to the transmission considered as a whole, that is, from the viewpoint of the man who is about to buy one, the friction transmission is of the simplest possible construction, has the fewest number of moving parts, and is the most economical to maintain and the easiest to care for. It consists of a special alloy disc on the terminal of a shaft connected with the flywheel. Against this disc a sliding friction wheel with a fiber rim is engaged at any point on the surface from the center to the outside, thus giving any speed desired. Sprockets and chain connect this countershaft with the rear axle.

Speed changes are made by means of a hand lever, this one lever determining all speed ratios from low to high; also the reverse. After the lever has been placed in the desired position, control is then obtained by means of the left pedal which engages the friction, thus corresponding in action to a clutch as commonly used on other automobiles.

The control afforded by this transmission is one of its chief features, and its great superiority over other forms of trans-



Valve Side of 30-35 Horsepower Engine of Model L Cartercar Accessory Side, Showing Magneto and Pump, Also Fan



Section Showing Construction of Carter Steering Gear

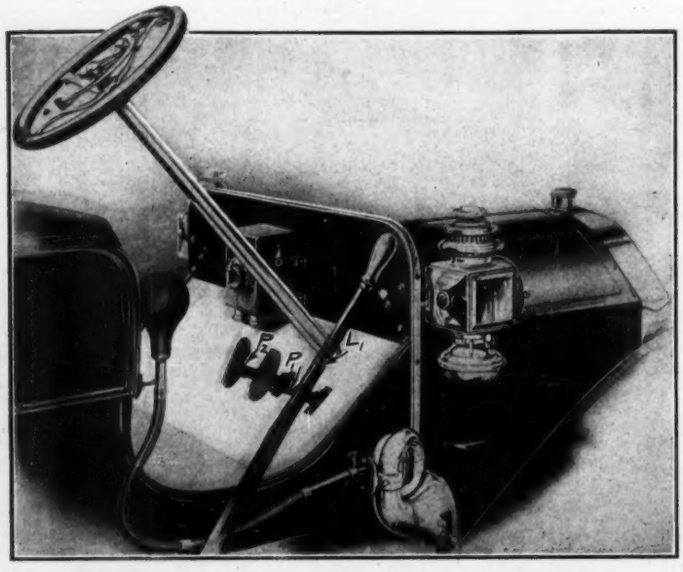
mission is instantly apparent. Any number of speeds is provided from zero up to the maximum, and changes can be made instantaneously without noise.

The car is started or stopped by the use of this friction pedal with the left foot, in conjunction with a powerful brake, operated by the right foot through a similar pedal. It will be seen that the operator has instant control of the car at all times without the necessity of reaching for hand levers, or of removing the hands from the steering wheel.

The fiber rim or filler on the friction wheel can easily be renewed after it has become worn down. The car will run upwards of 4,000 miles before the filler needs replacing.

The moving parts of this transmission are lubricated by turning three grease cups occasionally, an operation which can be performed by a lady or gentleman without soiling the clothes.

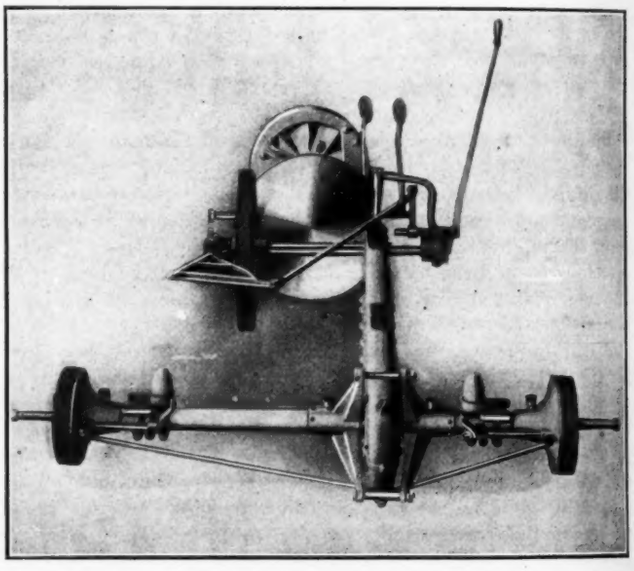
Simplicity of control always appeals to the man about to purchase a new car, for he has visions of the ten or more things to be done at once, all of the things to be thought of, all of the parts, levers, etc., to be operated, and anything that sounds like a reduction in the number of parts, a lessening of the things to be cared for or done, and a reduction in the worry incident to the whole, sounds very advantageous. Thus, with the friction transmission, while operating the car through crowded streets, or on thoroughfares where frequent slowing and stopping are necessary, control can be had entirely with the feet, acting in connection with the throttle and spark levers on top of the steering column. There is no need for changing speeds as in other cars, for the extreme flexibility of the friction permits the car to be run as slowly as need be on the high, and with no danger of jerking the car or of stalling the engine.



Friction Drive Makes a Very Simple Control System

It is a well-known fact that there is a great waste of power on low and intermediate speeds in a gear transmission: also that the meshing and turning of a number of gears produce considerable noise. The Cartercar friction transmission is noiseless on all speeds, and has a very high efficiency, delivering more power to the rear wheels than any competitive form of transmission. This has been proven, in part, by the great success of this particular form of transmission in this make of car in hill climbing contests and private trials of the same nature, in which the car is said to have ascended grades of 50 per cent, that is a rise of 50 ft. in 100 ft. length.

Referring specifically to the cut of the transmission as a whole shown on this page, the parts may be noted in their correct positions, relative to one another. Referring also to the steering gear drawing at the head of the page, this will be seen to be of the worm and segmental gear type. The worm W_1 meshes with the segment S_2 which carries on the end of a squared shaft S_3 the operating lever, which is connected to the front axle, and through which the actual work of steering is done. This squared shaft is made an integral part of the worm segment, and the necessary strength of this combination is thus gained. The thrust from worms is known to be considerable, and in this case, proper provision is made for it, by fitting the two ball thrust bearings, T_1 on each side of the worm. Steering is actually effected by the movements of the external tube T_1, upon which the worm is fixed. Within this, there is another tube T_2, which forms a bearing for the lower end of the larger-sized tube, while within this in turn is a third tube T_3 which operates the throttle lever. This Chinese nest of tubes carries still further, the final inner one T_4 carrying the movement of the fingers on the steering wheel down to the spark lever, operating the timing disc on the magneto and timer.



Detailed View of Whole Driving System, Both Friction and Chain

At the bottom of the page is shown a photograph of the dash board, front seat, and control mechanisms, revealing clearly the small number of parts necessary to complete operation. The hand lever L_1 operates the changes of speed, the two foot pedals corresponding to the usual clutch and brakes, one, the right, P_1 operating the internal expanding foot brakes, while the other, the left, P_2 throws the friction disc out of engagement so that changes of speed may be effected.

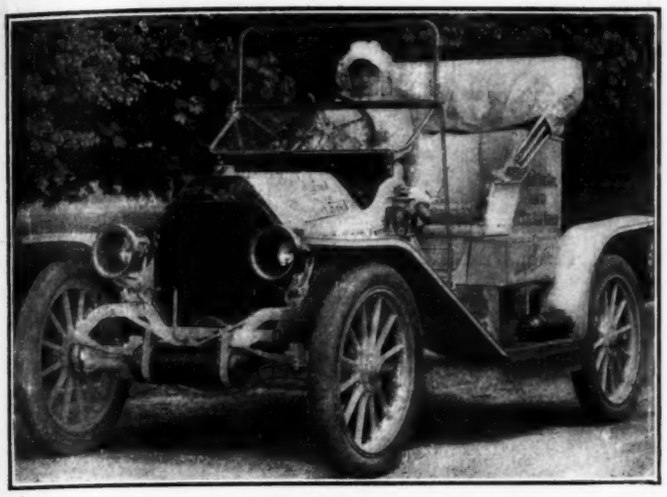


Fig. 1—Willys-Overland Model 38 equipped for a trip to the coast with a woman pilot

Characteristics of Model 38 Overland

THIS model of the Willys-Overland cars is the one which is being used in the "transcontinental" run. The start was made from New York for the Pacific on May 23, and, while it is not the idea of the projectors of the trip to do any speeding at all, the fact remains that the automobile will be tested out to the limit of its touring capabilities, and it will also have to sustain its reputation for ease of operation in the hands of a woman driver. As reported last week, Miss Blanche Scott has the matter of the piloting of the automobile in hand.

Some Features of the Model 38 Overland

Ground clearance is a necessity in any automobile which is expected to serve under touring conditions, especially in a transcontinental tour, and in this model, the low point, which is at the center of the rear axle, is as shown in Fig. 2. This photograph was taken by the "staff photographer" of the AUTOMOBILE, in New York, before the car started on its run to the Pacific, and, in the photograph, to show the exact clearance, a rule was placed vertically at a point just behind the rear axle; this rule tells the story; the clearance is 10¾ inches at the lowest point, and, as designs go, this clearance is quite up to the most fitting requirement.

The I-section front axle is shown in Fig. 3 just at the knuckle, and the Elliott type of knucke is also clearly brought out. A further examination of the construction discloses a tight construction around the hub flanging F, with a packing joint P to exclude all foreign substances and retain grease. The knuckle K is a substantial drop forging, heat treated to bring out the desired kinetic qualities, and the bearing surfaces B1 and B2 are not only ample but the fitting is well executed. The knuckle-pin is locked by means of a nut which is castellated, and a grease cup G at the upper end serves to supply lubricant to the bearings. The wood of the wheel is second growth hickory of the first grade; bastard spokes are cast out, and the whole construction is such as to lend confidence to the user.

Rear Axle Is Designed to Withstand Service

Considering Fig. 2, which shows the rear axle very plainly, all that will be necessary for the time is to present Fig. 4 which is another view of the axle, taken at a point to bring out the construction of the axle and brakes with details of construction at this point. It has been the aim in taking these photographs to let the camera tell the story, and it is so well indicated that no further statement will be made at this time, unless to point out that the brakes are of large area and of proven worth; they will, of course, be given a good working test in this run.

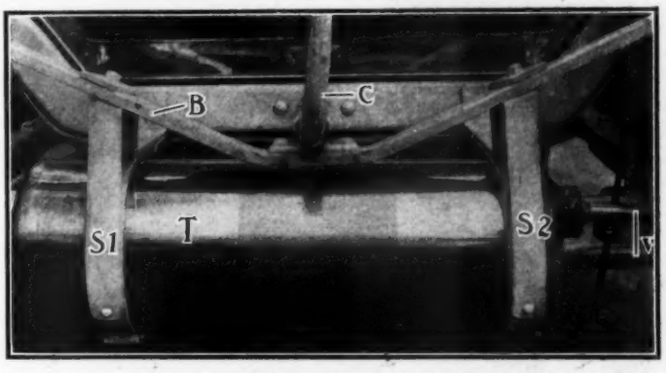


Fig. 5—Front view presenting method of holding the acetylene tank in a position which clears the starting crank

Special Disposition of the Lighting Equipment

Referring to Fig. 5, of the placing of the lighting tank T, the support B is so made and placed that the tank is below the starting crank C, and the tank is held in secure relation by the bands S1 and S2. This idea has the virtue of having the tank close to the lamps which receive the gas (acetylene) and the

(*Continued on page 944.*)

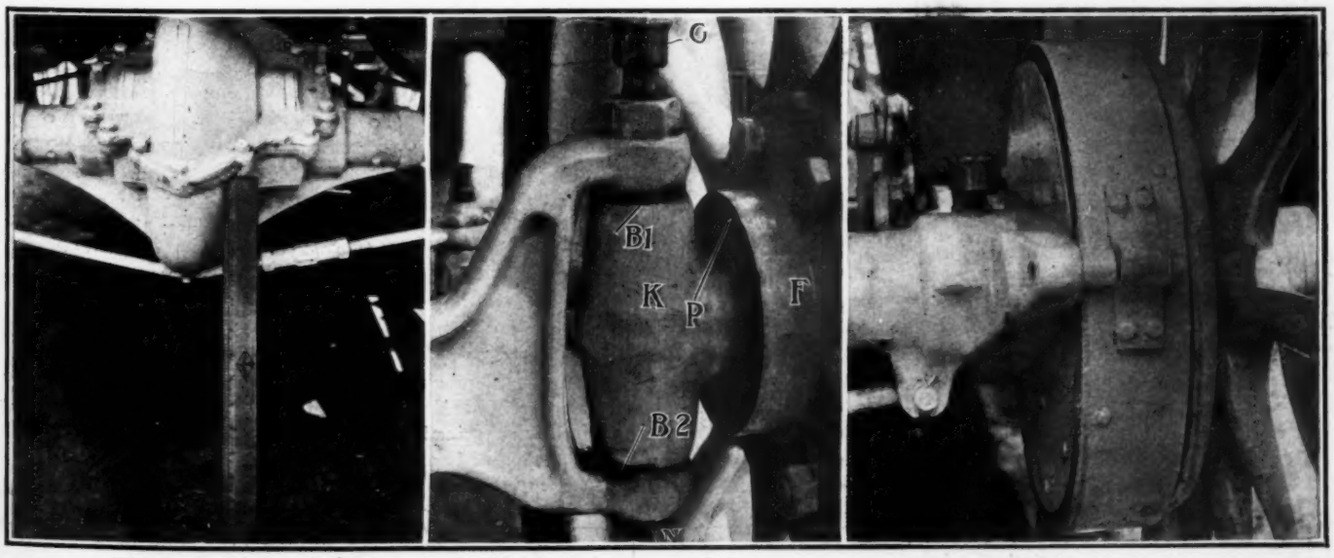


Fig. 2—Enlarged portion of live rear axle with a ruler placed vertically to show actual clearance between the ground and the car at the lowest point. Fig. 3—Photograph of I-section front axle, Elliott type of knuckle, and refinements of design and construction. Fig. 4—Photograph of rear axle, brake drum, and part of rear wheel showing external constricting band brake.

HARTFORD, CONNECTICUT, one of the first cities in the United States to take up the manufacture of the automobile, occupies a leading position in motordom. It has several big factories devoted to the production of automobiles and the Automobile Club of Hartford is one of the typical motor organizations of the country.

The importance of the automobile as a factor in the commercial life of the city and State is as well appreciated in Hartford as it is anywhere in the country and this appreciation is largely accountable for the work done by the automobile club.

It has overcome prejudice and modified hostility on the part of lawmakers by a nice observance of the rights of the public and, as a result, the use of the automobile and the rights of motorists are conceded by the public.

Connecticut has one of the most liberal automobile codes in the land. There is no law that says that a certain maximum speed shall be deemed *prima facie* evidence of recklessness and on the other hand, the motorists agreed in exchange for this reasonable provision, that the roads of the State shall never be used for racing.

This statute was urged by the State association, but the chief factor in that body always has been the Automobile Club of Hartford. The club is large, reckoned from any basis, having nearly 400 members. It is intensely active and has a hand in everything affecting motoring.

But its great mission is toward the sporting end of automobiling. Its annual reliability contest is one of the classics. It always attracts a representative entry list and it is conducted upon precise and technical lines so that when a car shows excellence in the contest, the excellence of the car itself is a long way on the road toward proven worth.

This year the big event, the All-Connecticut Reliability Contest, is scheduled to start May 19 and after covering about 80 per cent of the State, will finish May 21. The route is some 600 miles long. Rules of the A. A. A. will be strictly followed and will be administered by officials who have had much experience in that line of work. Chairman Butler of the A. A. A. Contest Board is an honorary officer of the run.

There will be seven classes under the rules as provided in the divisions of Class "A" and cups for the winners in each class have been offered.

Former runs of the club have proved successful to a notable degree and the entries this year foreshadow an unusually favorable contest.

The sporting history of the club includes a hill-climb in 1907 and endurance runs in 1908 and 1909, all of which were milestones in the record of automobile development.

In addition to the annual contest, the club engineers numerous runs during the season, of one day duration. These are mostly for club members and have proved to be an enjoyable feature of club life. This year the club is preparing a more comprehensive program and at least one tour of two days will be made, while half a dozen of the shorter and more informal events will be carded.

The contest this year will be held under the auspices of the Hartford club, but in conjunction with that organization, the clubs of Bridgeport, New Haven, Willimantic, Litchfield County, New Britain and Yale University will act co-ordinately and support the event in every way possible.

The Connecticut Automobile Association devotes itself largely to legislative problems and so the individual clubs are obliged to direct their activity toward other ends, so that the whole field may be adequately covered. Thus the matter of good roads is left largely in the hands of the various organizations about the state. The Hartford club, because of its central position and size and importance, is a leader in this particular. It also makes a specialty of defending its members who are subjected to persecution rather than prosecution for alleged infringements of the laws. While the State statute does not provide any specific speed limit, beyond which it is presumed that the motorist is not observing reasonable caution, nevertheless, there was formerly a pronounced disposition upon the part of certain peace officers to make it disagreeable for tourists. When arrests are made under unwarranted circumstances, the club takes up the battle of the individual and in every legal way tries to get justice for the alleged offender.

Within the membership of this organizaton has been formed the Aero Club of Hartford, and many of the most influential motorists have joined the enterprise. Instruction in the principles of aviation is a feature of their meetings and in the near future, a meet which will bring together several of the leading air navigators is being planned.

The Automobile Club was formed in 1904 with about fifty members. Like almost all of the senior automobile organizations of the country, it led a precarious sort of life for several

years, but commencing in 1907, when it began to take part in the big sporting events of motordom, the club started to grow mightily. Its membership swelled to nearly 300 and quarters were taken in Allyn House. During the ensuing two years, more progress was recorded and the club leased a storeroom adjoining the hotel property and fitted it up as headquarters.

As power, influence and finances were piled up, the needs of further equipment became apparent and this Spring it was determined to secure a country house for the benefit of the members. After a careful search for available locations, the members have decided that the place shown in the accompanying illustration fills every requirement. The house is a large, old-fashioned country place, standing in a fine estate in the hills back of Hartford, just a comfortable distance from the city to afford a pleasant run. A restaurant, grill-room, sleeping quarters, and all other accommodations of a first-class country club will be installed as soon as a few formalities have been completed. It is intended to open the new house early this season.

The social life of the club is extensive and entertainments are frequently given. It is a distinct factor in the progress of Hartford and is highly regarded by motordom throughout the country.

The officers of the club always have been representative citizens. Hiram P. Maxim, son of Sir Hiram Maxim and one of the most advanced thinkers in mechanical lines, has served several times in executive posts. At present Mr. Maxim is chairman of the Contest Committee of the club and is a leader in the Aero Club of Hartford.

C. H. Gillette, who was identified with the first running of the Vanderbilt Cup race, is president. Mr. Gillette served as referee at the opening Daytona speed meet and was secretary of the A. A. A. for a period. A. G. Hinkley is vice-president. Mr. Hinkley is one of the leading automobilists of Connecticut and is an enthusiast on the subject of the future of the motor car. Philip E. Curtiss, a newspaper man, connected with the editorial staff of the Hartford Times, is secretary and C. D. Alton, Jr., is treasurer.

Messrs. Gillette and Curtiss also serve respectively as president and secretary of the Connecticut Automobile Association. W. T. Plimpton, with the title of assistant secretary, is in direct charge of the detail work of the organization.

The club is one of those solid bodies, founded upon a principle and seeing a definite object to attain. It is a sort of rallying point for motordom, and if it has a pre-eminent characteristic it is that of sturdiness and quiet strength.

Aviation Meet for Louisville

LOUISVILLE, May 16.—An aviation meet will be held at Churchill Downs, on Saturday and Sunday, June 18 and 19. Col. J. L. Gribble will manage the affair and in addition to the aeroplane flights there will be a series of automobile races, open to local drivers only. These races will be run for handsome loving cups and will comprise not only events for speed at various distances, but also trials for car control and other tests of driving skill, while special events for women drivers also will be arranged.

Glenn H. Curtiss, Charles F. Williard, "Bud" Mars, Horace B. Wilde and Carl Bates will bring their air craft to Louisville and take part in the events.

Names Atlantic City as Its Goal

At a recent meeting of the board of directors of the Binghampton Automobile Club it was decided to hold the annual run of the club from Binghamton to Atlantic City. The event will take place some time in June.

Coming Events in the Automobiling World

June 20-July 6...Detroit, Mich., Industrial Exposition. Detroit Board of Commerce.
Dec. 1.....Chicago, Ill., First Annual Aeronautical Exhibition in the Coliseum.
Jan. 7-14, 1911...New York City, Madison Square Garden, Eleventh Annual Show, Pleasure Car Division, Association of Licensed Automobile Manufacturers.
Jan. 17-24, 1911...New York City, Madison Square Garden, Eleventh Annual Show, Commercial Division, A. L. A. M.
Feb. 13-25, 1911..Chicago, Coliseum, Tenth Annual National Automobile Show, N. A. A. M.

Races, Hill Climbs, Etc.

May 18-19.....Norristown, Pa., Third Annual Endurance Run, Norristown to Scranton and Return.
May 19-21.....Hartford, Conn., All-Connecticut Reliability Contest.
May 21-22.....Bay Ridge, L. I., Club's Endurance Contest Around Long Island, Crescent Athletic Club and Long Island Automobile Club.
May 21-22.....Track Race Meet, Memphis, Tenn., Homer C. George, Manager.
May 27, 28-30.....Indianapolis, Ind., Automobile Races, including Championship Events on Motor Speedway.
May 28.....White Plains, N. Y., Hill Climb under auspices of Amateur Automobile Contest Association.
May 30.....Fairfield, Conn., Hill Climb under auspices of the Bridgeport Automobile Dealer's Association.
May 30.....Oklahoma City, Okla., Reliability run under auspices of the "Daily Oklahoman."
May 30.....Bridgeport, Conn., Hill-Climb up Sport Hill, Automobile Club of Bridgeport.
June 2.....New York City, N. Y., Trade Association, Orphans' Day Excursion to Coney Island and Return.
June 4.....Worcester, Mass., Fourth Annual Hill-Climb, Dead Horse Hill.
June 6-14.....Atlanta, Ga., Reliability Run to New York City, New York Herald and Atlanta Journal.
June 7.....New Haven, Conn., Hill-Climb up Shingle Hill, Yale University Automobile Club.
June 11.....Wilkesbarre, Pa., Annual Hill-Climb up Giants' Despair, Wilkesbarre Automobile Club.
June 11.....Baltimore Hill-Climb of Automobile Club of Maryland.
June 14-15.....New York, Reliability Run of Motor Contest Association.
June 15.....Cincinnati, Seventh Annual National Reliability Run for Glidden Trophy, Through the Southwest.
June 16-22.....Albany Automobile Club, Albany, N. Y., Sixth Annual Tour to Atlantic City and Return.
June 25.....Port Jefferson, Long Island, N. Y., Hill Climbing Contest, Automobile Club of Port Jefferson.
July 4.....Indianapolis, Ind., Cobe Trophy Race. Held on Speedway Track, Chicago Automobile Club.
July 4.....Wildwood, Pa., North Wildwood Automobile Club, Race Meet and Club Run to Track.
July 18-22.....Milwaukee, Reliability Run, Wisconsin State Automobile Association.
July 30.....Wildwood, Pa., North Wildwood Automobile Club, Race Meet and Club Run to Track.
Aug. 3-5.....Galveston, Tex., Beach Races, Galveston Automobile Club.
Sept. 5.....Wildwood, Pa., Speedway, Labor Day Race Meet of North Wildwood A. C.
Sept. 17.....Syracuse, N. Y., Track Meet of Automobile Club of Syracuse, Syracuse Automobile Dealers' Association and the New York State Fair Association.
Sept.....Chicago, Commercial Car Reliability Contest of Chicago Automobile Club.
Oct. 1.....Long Island Motor Parkway, Vanderbilt Cup Race, Wheatley and Massapequa Sweepstakes.
Oct. 8.....Philadelphia, Fairmount Park Race, Quaker City Motor Club.
Oct. 15.....Long Island Motor Parkway, Grand Prize, Automobile Club of America.

Foreign Shows and Races

May 1-Oct. 1.....Vienna, Austria-Hungary, Automobile and Aviation Exposition.
May 25.....The American Cup," Argentina, Sociedad Sportiva Argentina, near Buenos Ayres.
May 28-June 9....St. Petersburg, Russia, Automobile Exhibition.
May 29.....Copa Catalunya, Voiturette Race of the Royal Automobile Club of Spain, near Barcelona.
June 2-8.....Prince Henry (German) Touring Competition.
June 13-18.....Scotland, Scottish Reliability Trials.
June 20.....French Voiturette Race.
June 21.....French Stock-Car Race.
June 22-July 5...Russian Touring Competition, St. Petersburg to Moscow; also Commercial Vehicle Trials.
June 27.....Speed Trials at Kiev, Russia.

THE AUTOMOBILE

Vol. XXII Thursday, May 19, 1910 No. 20

THE CLASS JOURNAL COMPANY

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A. B. SWETLAND, General Manager

231-241 West 39th Street, New York City

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GERMANY:—A. Seydel, Mohrenstrasse 9, Berlin.

Entered at New York, N. Y., as second-class matter.
The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907

IF it is true that there will be upwards of 200,000 autoists added to the stream this year, a large number of them will have a garage problem to tackle, and of this number many will decide that they will put a private garage in their own back yard. It looks easy enough to do so if space affords, but a year's experience in an undertaking such as this will be sufficient to tell them in language which will equal the threadbare plainness of the Anglo-Saxon tongue that there is more in the problem than the mere housing of a car. There are many indications of the fact that it is better to pay $25 per month to the keeper of a public garage than to take advantage of the apparent utility of a private establishment, only to come home with the automobile off of a muddy road, roll it into the garage, and let the accumulations of the roadside form a crust over its delicately tinted surfaces. When the crust comes off next day the delicacy of the tint will take wings. The cost of service in a private garage plan must include the cost of refinishing the car, if, in the absence of a chauffeur, the owner says "manana" (to-morrow) everything will be made spick and span—to-morrow never comes.

GASOLINE, while it is as safe as any fuel can be, is the storehouse of energy in compacted form, and must be treated accordingly. It is not a safe procedure to construct a pit under an automobile in a garage and have the same so tightly made that it will serve as a pocket for accumulations of gasoline and air in proper proportion to make an explosive mixture. There was a time when it seemed to be necessary to crawl under automobiles to fix them, or better yet, to make an examination with a view to ascertaining why they would not run; as they are now made, referring to those which are worth having, it is not necessary to explore the under region, and a pit, if it is made at all, will be for one purpose only, i. e. to court an explosion.

BRIGHTON BEACH furnished a new version of the attitude of the autoing public in respect to racing; patronage was so profuse that the authorities in charge of the race were short on its welcome. At one time between seven and eight o'clock in the evening of the first night there were 750 automobiles, full of autoists who were anxious to pay the entrance fee and see the sights. The back yard of the race track was packed with automobiles; they came from near and afar, and there was never a moment during the whole time when they showed much of the impatience which they, by right, might have allowed to come to the surface, due to the lack of preparedness of the management of the event. The real answer to all of this lies in the fact that the weather was cold and the wind blew; the attendance on former occasions was moderate, and it was thought, perhaps, that there might be a comfortable attendance, but there was no inkling of the jam that followed. This opening track event, if it spells anything at all, rather goes to show that the autoing public is ready to support the industry, either in or out of school.

GLIDDENITES, now that the Pathfinder is home from its long jaunt, are gladdened with the joyful news; it tells of the extent of good roads, both in fact and in prospect; they are not so bad as some might have supposed, and of the attitude of the citizens of the Southwest, it is enough to say that they extended their accustomed welcome—the whole-hearted kind, penetrating in its characteristics, and lasting besides. There is a surprise awaiting the citizen who thinks that the States which are included in the path of the Glidden Tour are lacking in automobile interests. It has been shown elsewhere in this issue of THE AUTOMOBILE that the industry is well represented both in manufacturing and from a trade point of view; moreover, the number of automobiles now being used in these States are in full keeping with the general condition of the automobile trade in other parts of the country. It is claimed that the Glidden Tour will serve as a missionary band this year, and it will.

ARE automobiles now so well made and so simple that any woman can take one and run it without having to call upon a man to assist in cranking, or in doing any of the work that may have to be attended to in order to obtain the expected service on the road? This year an attempt will be made to prove that any properly designed automobile is up to this requirement, and even though the proof may be a little lacking in some respects, the fact remains that it will show great contrast considering the automobiles of even a few years ago; they even refused to bow to the wiles of a man of mechanical experience.

How Independents Will Fight A.L.A.M.

PLANS of the Association of Motor Car Manufacturers, the organization of independent makers formed in Detroit recently, are outlined with considerable detail in the following letter addressed to various independent automobile companies by Henry C. Walters, attorney for the association:

"Referring to the meeting of automobile manufacturers held on the 2d instant, pursuant to the call sent out by me at the request of the organization committee under date of April 25th: The meeting was held and was largely attended, as you will see from the notations on the side of this sheet. As no word was had from your company, I think it is not amiss to advise you in some detail of what was done, especially as the final meeting will be held at the Hotel Ponchartrain, Detroit, at 10.30 a. m., on Monday, the 16th instant. It is hoped that you will have a representative present authorized to act in the matter of joining the organization.

"I think it advisable to state to you that this association of companies has not been brought about through the efforts of a Mr. Russell, who has been sending out circulars from Indianapolis, announcing meetings which were not held. This statement is made for the purpose merely of conveying the information, and with all due respect to Mr. Russell. A number of inquiries as to his connection or non-connection have been made, and it is thought that you, too, may be interested.

"If the reason you are holding back from joining a defensive organization is because you have private assurances that you will not be disturbed, you may find something to interest you in the information which I now give you, that many of the companies against whom actions are now pending had applications for licenses before the association, which had not been acted upon, and which it seemed, from the inquiries made by the association, would be favorably disposed of; some of the other companies that have been sued were privately informed by those high up in authority in the A. L. A. M. that no action would be commenced against them.

"I learned these facts through personal conversation with officers of the companies now engaged in defending themselves against the actions instituted. My opinion is that the licensed association has its plan laid and knows now just what companies suits will be started against, and just what ones will not be molested. I do not think the fact of joining the association will result in the commencement of suits against the particular ones joining—even if their names are made known. I cannot do better, by way of informing you what has been done on the 2d instant, than to send you the following extract from one of the letters which I sent out on the 3d instant.

An association was formed to be known as the Association of Motor Car Manufacturers. The association is for the purpose, as expressed in the articles of agreement to be signed by each member, of the development and advancement of the automobile industry, the stimulation of legitimate competition, improvement of motor car construction by voluntary interchange of economic ideas relating thereto, and the mutual protection of its membership against illegal and oppressive action. Any person or corporation manufacturing motor cars, pleasure or commercial, and not operating under a license issued by the claimed owner or owners of the Selden Patent, is eligible to membership in the organization; the applications of those desiring to come in at a later period will be passed upon by the executive committee, if it is decided to admit others later. There seems to be a well defined opinion that those who stand aloof at this critical period in the automobile industry, so far as non-licensed companies are concerned, should not be taken in afterwards. I am not prepared to say what will be the ultimate decision in this regard. The affairs of the association will be managed by an executive committee of five persons, which committee will be elected or appointed by a general governing body composed of one member or trustee or representative from each manufacturer in the association. The membership or affiliation fee is $500. The annual dues will be not less than one-fifth of one per cent of the retail list price, nor more than one-half of one per cent, of the total number of cars manufactured and sold during the current year; the dues are to be called in by the executive committee as the necessities of the association seem to require. Some difficulty was encountered in the matter of fixing amounts to be paid in by the members of the organization, for the reason that it is not known just how much will be needed. The initial object of the association is that of defending against present and future actions instituted by the A. L. A. M. It was thought that a number of the best patent lawyers and two or three equity lawyers should be retained by the organization; they will need the assistance of mechanical experts of the highest type; this, together with the taking of testimony on behalf of the complainants and the defendants, about the country, will be rather expensive. A wholehearted, instead of a half-hearted, defence must be made of every action commenced, and the penny wise and pound foolish method must be relegated to the rear. These considerations resulted in the fixing of the minimum and the maximum—the understanding being, of course, that only such monies will be called for by the governing committee as are actually needed. The governing committee will have power to increase the annual dues by a majority vote. Twenty-two companies were represented at the meeting, some companies having several representatives and almost all the companies having more than one representative present. A number of letters were received explaining the absence of representation and expressing willingness to join the organization. Almost all the companies represented actually signed, or agreed to sign the articles of agreement; some of those present stated that they had to take the subject up with their boards of directors before signing, but each of such persons said that they had no doubt at all but that their boards would take favorable action. The meeting was adjourned until Monday the 16th instant, at 10.30 a.m., second floor of the Hotel Ponchartrain, Detroit, Mich., at which time it is expected that one duly accredited trustee or representative will be present from each company in the organization; more than one person may come and may take part in the meeting, though each company will have but one vote. The principal object of this meeting is the election of the executive committee. I have given you a full résumé of the articles of agreement, to the end that you may present the matter to your board for its consideration. If you decide to join the association wire me at once to that effect, and I will call upon you with the original agreement for your signature. It was definitely decided not to send out over the country copies of the agreement nor to publish names of the membership. It will undoubtedly interest you to know that if Judge Hough of the Second Circuit sitting at New York declines to suspend the operation of the injunction, in the Ford case, pending the appeal the A. L. A. M. will likely file a batch of additional suits and apply for preliminary injunctions based on the action of Judge Hough. His action will not be binding on Circuit Judges in other circuits, but it will have a strong persuasive effect on account of the comity existing between the different circuits. It can be urged with great force, in support of these applications, that a long and expensive trial has been had, with many eminent counsel engaged on both sides, and that since the patent has been sustained by Judge Hough so strong a presumption exists in favor of its validity that preliminary injunctions should issue forthwith. The present outlook is that a decree in the Ford case will be entered the latter part of this month or early in June; upon the entering of that decree, the question of the suspension or non-suspension of that injunction will at once arise. If you will be so kind as to let me hear from you at the earliest possible date, I will see that the original agreement is turned over to you for signature, if you wish to join us. The letter gives the entire substance of the agreement, with the exception of the preamble, which merely sets forth the reasons for the formation of the association. The present members of the association hope that your company will affiliate with them. Number of companies represented at meeting of May 2nd—22. Number of companies unable to send representatives but expressing by letter their willingness to join—10. Number of companies declining to join—1. Number of companies invited to attend on May 2nd—68.

DETROIT, MICH., May 18.—A special representative of THE AUTOMOBILE called upon Henry E. Walters, who is the spirit in the move which is being made to organize the independent makers of automobiles, and, while it is admitted that the organization is now about completed, Mr. Walters declined to state particulars in relation to the same. The regular correspondent of THE AUTOMOBILE, in a special wire in relation to the same matter, wired in as follows: "Organization of Association of Motor Car Manufacturers perfected here Monday and officers elected. Headquarters to be in Detroit. Henry C. Walters, attorney and spokesman, will give no further information."

Rain Mars Denver Race Meet

DENVER, May 18.—Track records were shattered during the two-day meet held here Friday and Saturday, and despite various kinds of weather, the races were a success. In the five-mile race for cars valued at $1250 and less an Overland defeated a Warren-Detroit in 6.20.

The five-mile handicap was won by the Darracq (Kerscher) from scratch in 5:11:80, as was also the Free-For-All handicap for the Governor Shafroth cup, three miles in 3 minutes flat. In this contest the Overland (Ballit) was second and the Warren-Detroit (Hough) was third.

The Benz (Oldfield) in the mile time trials made 54.1 the first day of the meet and reduced the mark to 53.80 yesterday. The Darracq (Kerscher) made the mile in 57.

Vogue of the Automobile in the South

MEASURED by the space of only two years, a revolution, or rather an evolution, of road conditions in the South has occurred. The good highways of that section of the land on a basis of two years ago must be multiplied by ten to reach a figure anything like the present status.

Of course, the whole evolutionary movement is based upon the constantly growing use of the automobile. In fact, the South has adopted the motor car as its own and the vogue of the automobile has swept through Dixie like a prairie fire on the Nebraska steppes.

For instance out of Jackson, Tenn., a town of about 20,000, there are 14 of the finest stone roads the hand of man can produce—most of them of considerable length. Rome, Ga., is the center of a spider line web of improved roads and so insistent are the residents of this county that these roads shall be continued that they recently formed a delegation to wait upon the citizens and officials of a procrastinating neighboring county and protest against their neglect to improve the highways.

Up in the famous Blue Grass country, around Davidson County, Tenn., the roads look like asphalt pavements, newly laid.

At this time in Brownsville, Tennesseeans from all over the State are gathering for the purpose of providing ways and means for the pushing of this good road movement as it never before has been forced.

In Atlanta the work of one man tells more than aught else, that is, the work of Major John S. Cohen, editor of the Atlanta *Journal* and father of the Atlanta-New York tours.

Major Cohen is following up this great work of road building in the hope that within a few years he will see the materialization of the dream of his life—a fine highway from New York to Atlanta.

This, then, is the prime motive of the New York-Atlanta tour. It is a good roads tour and it is having a wonderful effect upon the citizens of the country adjacent to the route of the tour as laid out last year. Even to-day it is conceded to be the best 1,000 miles of continuous roadway in this country. Every day entries are coming in to the offices of Major Cohen so that it will not be surprising if when the caravan starts North June 6, there will be close to 100 cars in the line.

In Decatur County, Tenn., the improvement of the roads was halted by a lack of funds—so a corporation was formed by men of means and the roads were built by this corporation upon these conditions: Every five miles is blocked off by a toll gate to pass which costs nine cents. When the corporation is reimbursed, then the road shall be free or the county may pay off the debt and destroy the toll gates at any time.

One important phase of the southern road situation, a phase which makes the upkeep a minor problem comparatively—is the use of convict labor.

In most of the States convicts are kept constantly on the road-repair gangs and this naturally tends to keep the roads in finest condition.

A vigorous fight is being made throughout the South against the non-progressive land owner, who is balking against the improvement of the roads, because of the immediate expense.

The automobile has done this service for that section in the matter of road improvement.

Where formerly one or two bales of cotton formed a big load for wagons, now five and six bales are easily handled over the perfected roads. Not only that, but the truck is rapidly coming to be an integral part of the commercial life of this country and the day when the entire farm product shall be hauled in by this means is not far distant.

With the increasing popularity of the cars themselves, it was only natural that the manufacturing phase of the situation should receive considerable attention. Eight Southern concerns have been formed to produce cars, of which five are actually turning out completed machines.

The following items of current news indicate the breadth of the interest taken in the South with regard to the automobile:

RICHMOND, VA., May 16—Ending in a sprint that could hardly have been more spectacular, the *Times-Dispatch* endurance run was concluded in this city, two hours ahead of schedule. A Hudson, Chalmers, Reo, Buick, Rambler and a Stevens-Duryea finished with clean scores and were named as winners of their several classes. Thirty-three cars competed and the affair proved to be a big success in every way.

ATLANTA, GA., May 16—A Southern automobile company, backed by men worth many millions, but capitalized at $200,000, as a starter, all of which will be paid in before the first car is on the streets; and a company that will make practically all of its parts, save bodies and wheels, has been launched in Atlanta.

This company is called the Primo Motor Company.

The motors will be turned out by the Van Winkle Gin and Motor Company, which has a million dollar plant in Atlanta, another one almost equally large in Gulfport, Miss., and which sends cotton gins 'round the world. The building in which will be made the Primo motor is located on the Van Winkle property, on the Southern and Western and Atlantic railroad lines and it is already nearly completed. The building and the machinery cost about $50,000. The assembling room will be built near the motor factory and will be a building so designed as to allow 200 or 300 cars to be handled a year. Application for a Selden license will be made.

The first machine turned out will be a roadster. It will have 110-inch wheel base, 36-inch wheels, a 4-cylinder engine and a horsepower of 25-30.

This car will be sold for $1,250. Later on a touring car will be added to the string and this will sell for $1,400.

The Primo line will make a special bid for the Southern trade because of its option of standard and wide treads, because of high power, strong frame and high wheels.

The first demonstrator will leave the Van Winkle works in 30 days and regular deliveries are being promised for 90 days. These will be the 1911 models and about 200 will be made.

The officers of the company are E. Van Winkle, president; J. F. Eskew, vice-president; W. O. Field, secretary; Ed. A. Cerf, treasurer; J. J. Murphy, fiscal agent; Henry S. Miles. Ed. M. Pearce, directors.

ATLANTA, GA., May 16—Despite the fact that the spring races of the Atlanta Speedway were far from the financial success that the promotors desired, the Atlanta Automobile Association is going right forward with plans for a meeting next fall.

Though the track, at present, holds more than its share of the American speedway records, an attempt will doubtless be made before fall to add considerably to its speed possibilities.

The chief weakness in the track is the fact that the turns are not banked high enough for fast moving cars.

While the meet was in progress the project was discussed of making the turns out of timber, like the Los Angeles track.

An effort will be made to change the dates assigned to Atlanta for the fall meeting. The present dates awarded by the A. A. A. are Oct. 17, 20, 21 and 22.

The program of the fall meeting will contain fewer long races than any of the others and more events for high-powered cars than ever before.

The prospects for general success is flattering as interest is at a high pitch with regard to the meeting. The announced policy of the management is expected to bring a flood of entries.

News Notes from the Quaker City

PHILADELPHIA, May 16—State Senator McNichol, in an effort to raise money to carry on this municipality, whose financial affairs are somewhat tangled, sees a chance to add possibly $300,000 a year to the exchequer. He proposes to introduce a bill into the next Legislature providing for the taxing of all automobile owners, the money to be returned to the counties from which it is derived.

The Senator thinks every man owning a car costing $1,500 or less, should be assessed at least $15 per annum; owners of cars listed at from $1,500 to $3,000 should pay $20 and all over the last named amount $25 per year.

"Such a law," says the Senator, "would be of material assistance to the counties in maintaining public roadways, and no class of drivers should be more interested in keeping up the highways or more willing to bear their fair share of the expenses of maintenance than automobilists."

Naturally motor car owners all over the State fail to enthuse over the Senator's scheme; but he's going to introduce the bill next Winter, just the same. J. A. Wister, president of the Philadelphia Automobile Trade Association, thinks motor car owners are already shouldering their fair proportion of such expense.

"The license tax," he says, "already nets the State from $5 to $15 per car, according to the horsepower, in addition to which automobile dealers pay a mercantile tax, just the same as any other business men."

The first step in the promotion of the annual 200-mile Fairmount Park race was taken last Thursday when the Quaker City Motor Club was granted permission to use the park roads for that purpose by the Fairmount Park Commissioners. The same rules that governed last October's successful race will obtain next Fall. The Department of Public Safety will be asked to supervise the police arrangements, and the net proceeds from the sale of grandstand seats and parking spaces and from other sources—they amounted to upwards of $8,000 last year—will be donated to the public charity or charities named by the Department of Public Health and Charities.

Last year's unprecedented success made the work of securing the necessary permission very easy for the club officials—the commissioners were a unit in declaring themselves in favor of it. All hands seem to recognize the prestige the race gives Philadelphia.

Entry blanks are out for the annual Spring race meet of the Quakers at Point Breeze track, Saturday, June 4. Seven events will be on the program, including a 50-mile race open to the fastest cars in the country.

The Quaker City is to have a motordrome. The Philadelphia Motordrome Association, with a capital of $2,000,000, has been incorporated under New Jersey laws, and will build a two-mile track at Clementon, N. J., about 12 miles from the City Hall. The plans contemplate an oval of solid concrete, surfaced with champed vitrified brick, with an immense grandstand capable of seating 25,000 people, and big "bleachers" with a capacity of 30,000, garages, a big fireproof hotel, an administration building, two club houses—one for auto enthusiasts, the other for sky racers—a high-power electric plant and other accessories are a few of the adjuncts of the proposed plant.

Among those interested in the project are A. C. Patterson, president Excelsior Trust Company of Philadelphia; H. S. Reed, assistant treasurer Union Trust Company, Philadelphia; Louis Kuehnle, president Marine Trust Company, Atlantic City; M. R. Margerum, secretary Interstate Fair, Trenton; M. C. P. Parker, Harry J. De Bear, E. L. Bixby, C. E. Folmer, Frank G. Cassler, W. H. Woodward and George H. Robertson, the famous racing man, under whose supervision the track will be built. Milligan & Weber are the architects, and S. Boyer Davis, attorney of the Automobile Club of Philadelphia, and Weaver & Drake, are the counsel of the association.

The annual roadability run of Philadelphia Premier owners will be held on Saturday, June 11, with Cape May, last year's objective point, as the destination. The route selected this year will include many of the roads traversed by the recent successful run of the Motor Club of Harrisburg on the second day—May's Landing, Vineland and Millville being among the points on the route. The Harrisburg run proved such an object lesson to the road authorities in South Jersey that they are hastening to put the few bad stretches in shape before the Premier run.

Many brush agents, sub-agents, and owners in this section drove to Reading last Saturday to partake of the hospitality of the G. M. Britton Company, agents for the car in that section. A banquet at the Mansion House was the chief feature of the entertainment.

G. Hilton Gantert, who handles the Stearns here, has just acquired the sales rights in Philadelphia and adjacent territory for the Ohio car, a Cincinnati product.

News from South Bend and Vicinity

Work on the construction of the new addition to the Widaman garage at Warsaw, Ind., has been commenced, and the building will be rushed as rapidly as possible. The new addition will be 50 feet long and 60 feet wide and two stories high. The addition which will be when completed one of the substantial and artistic buildings of Warsaw will comprise a show room for new automobiles, about 50 feet square, and an office on the ground floor. The second floor will be used as a workshop, an elevator being used to lift the machines to this floor.

The electrical department of the Wood Electric and Manufacturing Company of South Bend, which was sold last January to F. G. Rapp, of Fort Wayne, is being moved to Fort Wayne. The department was disposed of by the Wood company in order to make room for the increase in the business of manufacture of automobile engines. The Wood company began the manufacture of automobile engines a few years ago and its business has increased to such proportions there was not sufficient space for the growing electrical department; by the disposal of this the floor space has been increased 25 per cent. W. F. Wood, head of the concern, stated the company is receiving more orders for engines than can be filled.

Motoring Lively in Winnipeg

WINNIPEG, MAN., May 16—One of the most notable features in connection with the automobile trade in Western Canada this spring is the preparation by the Brush Canadian and the Canadian Overland company to undertake the assembling or manufacture of their cars in this country. Work has been commenced on a large factory at Regina, Sask., which will be rushed to completion.

The program for the automobile race meeting here in July has been finally drafted and decided upon. It will consist of six events, including one for the motor cycles, as follows:

Class A.—Cars not exceeding piston displacement of 160 cubic inches. Class B.—Cars not exceeding piston displacement of 230 cubic inches. Class C.—Cars not exceeding piston displacement of 300 cubic inches. Class D.—Cars not exceeding piston displacement of 450 cubic inches. Class E.—Commercial cars, open. Class F.—Motorcycles, open.

Parry Car Fast on Steep Hill

At the recent Kansas City hill climb, the Parry car finished first in its class, and according to word sent to the factory, it proved faster than eleven more costly cars.

St. Louis News of the Week

ST. LOUIS, May 17—The Major Motor Company is one of the newest arrivals in the St. Louis field. The company has leased the building at 1512 Locust street and is installing one of the most handsome garages and display rooms in the city. The Major company has the agency for St. Louis and most of Missouri, also a part of Illinois, for the Pennsylvania Company of Bryn Mawr, and the Herreshoff Motor Car Company of Detroit.

The St. Louis Automobile Club has sent out entry blanks for the one-day reliability run it is to give June 4 to every car owner in St. Louis. The run is to be for strictly amateur drivers and is to cover the most beautiful parts of St. Louis and Jefferson counties. James Hagerman, Jr., has donated a cup for touring cars and Edward J. Walsh a cup for roadsters. The entries will close May 31. The run is to start at 8 a. m., from in front of the club's headquarters in the Planters Hotel. It is open to stock cars only. It is expected that at least 100 cars will enter the run.

The Buick car "Red Wing," the official pathfinder for the St. Louis Manufacturers' and Dealers' Association, which started out Monday to chart the course of the three days' reliability run to be given June 28, 29 and 30, has been meeting with a rousing reception all along the line from good road enthusiasts. The car is driven by Frank Delaney. F. L. Robertson is another Buick representative on the trip. J. F. Foland represents the cup donors and Ralph B. Campbell the Manufacturers' and Dealers' Association. Mr. Campbell is charting the route and will make representations to the contest committee. The pathfinder car, it is expected, will have completed its trip by Saturday night. However, it may not return to St. Louis before Sunday. It has been decided that cars may be entered in the contest only by members of the association, but non-contesting cars will be welcomed in the run to any number.

City Comptroller Taussig has figured out that two automobiles, at a cost of $2,500 each, will save the city of St. Louis $14,400 a year, and, consequently, has ordered two cars which will take the places of sixteen men hitherto employed as street inspectors. By this means, Mr. Taussig declares the annual increase in taxes for the maintenance of the city will be greatly reduced. Mr. Taussig hit upon the automobile as a means of economizing when he looked over the long list of street inspectors on the municipal pay-roll. Upon inquiring why so many were needed it was explained that the men had to make their visits by street car and that, owing to the number of stops made by the trolley cars, and their inability to reach the points the inspectors have to visit, such a great number had become necessary.

Mercer Car on Transcontinental Run

Early Monday morning a 30-horsepower Mercer car left New York on its arduous trip from coast to coast with Los Angeles as its objective point. The car is in charge of C. H. Bigelow, a well-known western pilot, who expects to set a new world's record for the distance.

Aside from the missionary road work, Mr. Bigelow intends to lower the time record from New York to the coast, of 362 hours. Mr. Bigelow will travel but twelve or fourteen hours daily and will drive the car as far as New Mexico, where he will be met by Harold Hanshue, who will run the remaining distance of 800 miles. The distance for the entire trip of the Transcontinental Endurability Run is approximately 3,000 miles.

Will Tour to Indianapolis Races

COLUMBUS, O., May 16—Entry blanks for the reliability contest to be run under the auspices of the Columbus Automobile Club from Columbus to Indianapolis have been completed by the contest committee, of which Arthur M. Crumrine is secretary.

The run will start Friday morning, May 27 and the first day's trip will be to Richmond, Ind., where the night will be spent.

The second day's journey will bring the party to Indianapolis, where the races on the motor speedway will be attended. The return trip will be made in one day and the departure will be June 1. Already two dozen owners have entered their cars in the contest, which will be conducted under the rules of the A. A. A. It is expected that 40 cars will be in the contest.

Start from Times Square, New York City, of the Mercer Car, Which Will Cross the Continent to Los Angeles

Convict Labor for Michigan Roads

GRAND RAPIDS, MICH., May 16—With about 100 delegates from various portions of the State present, the third annual convention of the Michigan State Good Roads Association was held in this city May 12. The following officers were elected:

President, Philip T. Colgrove, Hastings; vice-president, N. P. Hull (master of the State grange) Diamondale; secretary and treasurer, Thomas M. Sattler, Jackson; former presidents William W. Todd, of Jackson, and Horatio S. Earle, of Detroit, will act with the officers as an executive committee.

The chief subject discussed at the meeting was the bringing about of a better system of highways without burdening the taxpayer with unreasonable taxes. The solution decided upon was the employment of convict labor on the highways.

In Michigan there are vast deposits of trap rock, one of the best of materials for the construction of highways. This rock, it was advocated, might be crushed through the use of labor from the penitentiaries and used to good advantage in the construction of new roads.

In his address, Mr. Todd advocated the establishment of road signs. He favored national aid in the construction of roads. Governor Fred M. Warner told of the growth of the good roads movement in the State, and Townsend A. Ely, state highway commissioner, advocated the use of convict labor. Robert H. Davis of the Detroit Motor Club pledged the aid of the automobilists of the State to the good roads cause and suggested a joint convention of the good roads association, the State grange and the automobile clubs to consider the matter.

At Holland City the ordinance regulating the speed of automobiles at eight miles an hour in the business district and fifteen miles an hour in the residence district has been declared invalid, the new Michigan statute superseding it.

G. A. Horner, general manager of the Rapid Motor Vehicle company, at Pontiac, is authority for the statement that, because of the lack of residences for workmen, the company has been forced to abandon many plans for improving and enlarging its plant. He says that the company needs 1,300 more men to handle its work.

At a meeting of the Hayes-Ionia Auto Body company, the following officers were elected: President, H. J. Hayes; vice-president, T. B. Preston; secretary, W. Q. Loomis; treasurer, W. B. Heath. The directors are F. W. Green, W. B. Heath, T. B. Preston, and W. J. Loomis of Ionia, H. J. Hatch and H. H. Smith of Detroit, and J. N. Willis of Toledo, Ohio. The capital is $150,000, of which $80,000 is preferred stock and $70,000 is common.

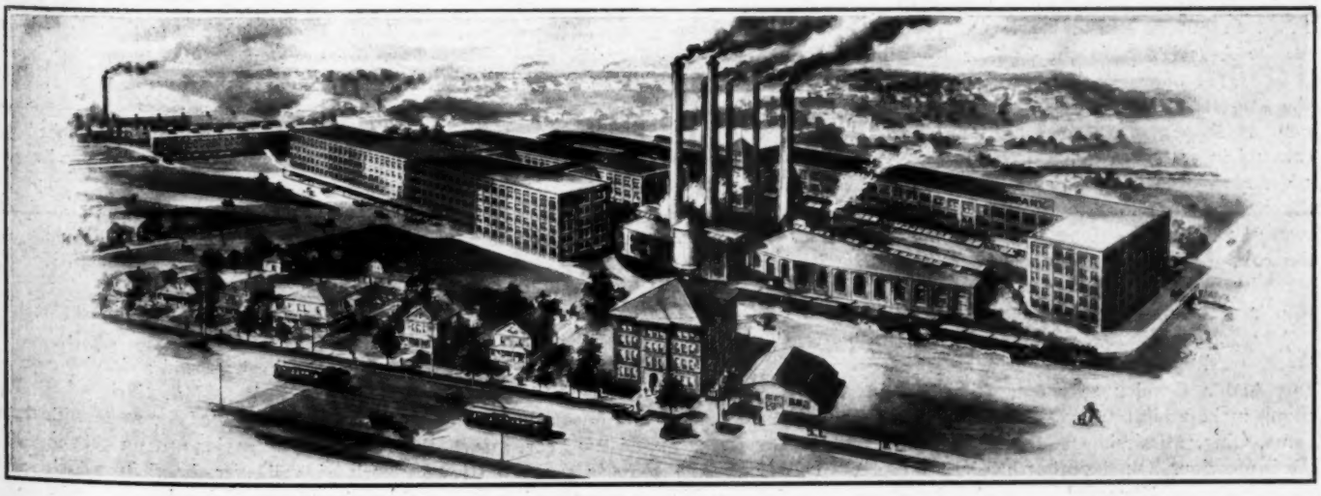
Motor Notes from Hoosierdom

INDIANAPOLIS, May 16—A three days' trade extension trip in motor cars will be made by the Indianapolis Trade Association, starting from Indianapolis May 31 and visiting a number of Indiana cities. The purpose of the trip will be to interest merchants in the cities visited in the products of Indianapolis factories and merchandise of wholesale and jobbing concerns of this city.

There is considerable doubt as to whether the American Motor Car Company, now in Indianapolis, will move its plant to Lafayette, as business men of the latter city and owners of the factory have been unable to agree on terms. The company, it is understood, has asked for a plant and equipment to cost $125,000 and a working capital of $100,000. Lafayette bankers, however, insist that with $125,000 invested in the plant, it would be impossible to advance more than $60,000 for working capital. They have suggested that the company modify its factory plans so that $100,000 working capital will be available, but so far these terms have not been accepted.

The newly organized Indianapolis Auto and Aero Club which has more than 200 members and is striving toward the 1,000 membership mark, is planning to place guide posts on all roads leading out of Indianapolis. These posts will be nine feet high and of iron. They will be placed half way of the route to Chicago, and also on all other highways leading out of Indianapolis. The campaign for membership is being carried on in every section of Indiana.

Visitors to the Indianapolis Motor Speedway in Indianapolis will see a new, or additional scoring system this year. Three huge scoring boards are to be erected, so that the score can be seen from all points of the course. Each board will be in charge of three men and will have three sections, each section being able to keep the time of ten cars.



Enormous Factory of the Goodyear Tire & Rubber Company at Akron, Ohio, Devoted Entirely to the Manufacture of Goodyear Tires

Glidden Pathfinder Completes Its Strenuous Task

(*Continued from page 911*)

There is only one reason for delaying any of the improvements which are to aid in bringing about the more extended use of the automobile, and that is represented in the time it takes in overcoming the inertia of the citizen who thinks he knows, but who is willing to admit that his knowledge is in the shape of a child-like inspiration; of actual experience he lays claim to very little, and of interest, it is secondary.

CHICAGO, May 16—Considerable of a stir was caused in Chicago Friday by the arrival of the Glidden pathfinder which marked the completion of the 1910 trail blazing expedition, which ran through thirteen states and on which journey the Chalmers car, in 30 days, covered 2,966 miles.

Not only did the Chicago Motor Club furnish an escort from the Mississippi river but it also showed its enthusiasm by tendering a banquet at the Chicago Athletic Association, which was one of the best motoring dinners ever given in this city.

Chairman Butler of the contest board of the A. A. A. was present, stopping off here on his way to Indianapolis and Detroit in search of Glidden entries.

Following the arrival of the pathfinding party there was a conference which resulted in the change of the date of starting from June 14 to June 15 because of squeezing in an extra day between Dallas and Oklahoma City. The Sunday stops will be at Hot Springs and Kansas City.

In addition to the nineteen entries already made the chairman announced that before leaving New York, he had been assured by W. C. Durant of the General Motors Company, that two Buicks and two Oaklands would enter. Mr. Butler had been informed that the entries of three Cartercars had been sent in, two in the Chicago trophy and the other in the Glidden.

Banquet Given the Homecoming Glidden Pathfinding Car at Chicago by the Chicago Motor Club

What the Glidden Pathfinder Encountered

CHICAGO, May 14—With the arrival of Dai H. Lewis, official pathfinder of the 1910 Glidden tour, and E. L. Ferguson, special representative of the American Automobile Association, in the Chalmers car here on Friday noon, May 13, the official laying out of this year's route which will be the longest in the history of the tour was completed, the speedometers showing a total of 2,851 miles for the cars which will contend in this year's American touring classic. As THE AUTOMOBILE has been in the habit of presenting an analytic review of the route in previous tours, the same policy is adhered to this season, and in the following paragraphs the general characteristics of the route, as given by Messrs. Ferguson and Lewis, are herewith printed for the general benefit of those manufacturers who have entered this year.

As mentioned in these columns last week, this year's tour embraces territory in thirteen States, seven of which have never before had a Glidden tour enter their confines. While thirteen States make a big total, yet the amount of traveling done in Alabama, Ohio, Mississippi and Missouri is so slight as to scarcely merit mention. On the other hand Kentucky, Tennessee, Arkansas, Oklahoma, Kansas, Iowa, and Illinois are crossed from side to side, whereas Texas and Nebraska are invaded to a slight extent. The average length of each day's run for this year is 198 miles, as compared with 178 last season. Although each daily trip this year will practically be 1 hour longer than last year, yet the pace will remain the same, namely 20 miles per hour for the large cars, 18 for cars listing from $800 to $1,600, and 16 miles an hour for those selling below $800. In spite of this high daily mileage, there are only five days on which the schedule exceeds the 200-mile mark and these trips are over the good-road territory beginning with Texarkana and ending at Davenport, the routes being: Texarkana to Dallas, 217 miles; Dallas to Lawton, 200 miles; Oklahoma to Wichita, 216 miles; Wichita to Kansas City, 234 miles, Kansas City to Omaha, 242 miles, and Des Moines to Davenport, 219 miles.

In contrast with these long runs are several short ones, namely, Cincinnati to Louisville, 162 miles, Nashville to Sheffield, 119 miles, Hot Springs to Texarkana, 131 miles and a Sunday morning run of 60 miles from Little Rock to Hot Springs. E. L. Ferguson, who made a careful comparison of the route with that of last year, asserts that it will be an easier one on cars in that there is not that long stretch of trail over the plains which was encountered last year through western Nebraska, Colorado, and western Kansas. There are, however, several physical conditions

different from those experienced in any previous tours. One of the most noteworthy of these is the creek situation encountered in the Nashville vicinity, and also in the region of Hot Springs. Before entering Nashville and after leaving the city, the roadway is crossed by a series of unbridged creeks, which in dry weather are never more than 3 or 4 inches deep, but after rain of a day or a day and a half these become swollen so that it is impossible for a car to cross them.

The first creek begins 50 miles north of Nashville, and in all there are from 40 to 50 of these within a radius of 50 miles of the city on the route traversed. Should a heavy rain precede the arrival of the cars in this district it will mean a delay of, perhaps, a day before the creeks subside, because by actual measurement it was noticed that they fall at a rate of 3 inches to the hour. These creeks are from 3 to 8 miles apart. The bottoms are soft soil. The creeks in Hot Springs and vicinity are considerably different; these streams range from 2 to 10 feet in width and have clear water with gravel beds. They are close together, many of them not being one-third mile apart. Authorities in Hot Springs and Little Rock are arranging to bridge a lot of these. The Hot Springs Motor Club has raised $1,000 for the work and has influenced the Little Rock and other clubs to donate $1,500 for the work, so that by the time the tour passes these culverts will be bridged over many of the 30 streams.

Another particular novelty that will be encountered this year is the ferry situation, as on three occasions the contesting cars will have to be ferried across large rivers. The first ferry is at Helena on the Mississippi river. The river at this point is very wide and the cars will be transported on large flat-top lumber barges which barges are 150 feet long and 30 feet wide, offering accommodation for thirty cars on each. These barges will be moored on the east bank of the river, and after all of the cars in the tour are loaded they will all be transported across the river together. At this point the levee, or artificial bank on the east side of the Mississippi is 15 feet high, and the Helena authorities will have openings cut through so that no difficulty will be encountered in loading the cars.

The second ferry is at Clarendon, Ark., where the White river is crossed. This is the scene of the famous pearl fisheries. The river is but one-quarter mile wide and at present the only crossing facility is a ferry which will carry three cars. The Helena people are coming to the rescue and expect to float one or two of the large lumber barges from Helena down the Mississippi and up the White river, a distance of 200 miles, so that the ferry problem at Clarendon will be favorably solved.

The third ferry is at Fulton, Ark., where the Red River is crossed. Fulton is but 20 miles out of Texarkana. As the river is but one-quarter mile wide, the one ferry with accommodation for six cars will prove adequate, as it requires but four minutes to make a round trip of the ferry.

In a progressive review of the general road conditions, beginning with Kentucky, it is sufficient to say that all of the roads in this State are macadam or pike as the natives term them, and the run across the State can be made on schedule, whether rain or shine. It was expected that the trip across Kentucky would embrace the famous Blue Grass country, but only the margin of it is touched upon, and that in the Louisville vicinity which is a noon stop for the first day. A 90-mile circuit through the heart of this Blue Grass territory was contemplated but it was eliminated.

The run across Tennessee will not prove so pleasant a trip, the creeks already spoken of being one of the conditions. In this creek territory, however, the roads are of gravel and there will be no trouble in maintaining schedules. Nashville has to date proven rather lukewarm on the improvement of roads, but it is hoped that in the next month some enterprise will be shown. It is impossible to predict what the nature of these roads will be like in June because there had been a cloud burst when the pathfinder passed through, and it was delayed more than a day in some places. Generally speaking, the Tennessee roads are not comparable with those in Kentucky. South of Nashville and extending nearly to Columbia is a particularly bad stretch, and between Columbia and Sheffield a second bad stretch will be met.

The fourth day of the tour, from Sheffield to Memphis, will offer some difficulties through the wooded territory, but the last 22 miles out of Memphis is one of the best macadam boulevards in the South. The spirit of touring is not developed in Memphis to the extent it should be, and while there are miles of good road in Shelby county, in which the city is located, it is stated there are not over three motorists in the city who have taken a 100-mile tour in the outlying district. Memphis as a city is growing steadily, and it is expected that once the touring spirit is developed the good roads cause will be greatly advanced. The 4-hour run through the stumpy region on this day's tour will be a good test of cars.

The run from Helena to Little Rock begins through the Buckshot land, which is a level territory similar to the gumbo regions of Iowa. For three hours the tourists will pass through the rice country, where at that season the plants will just be emerging through the top of the water. Once this rice country is passed, the cars will have a three-quarter mile climb of 6 per cent. grade which is on to the tail end of the Ozark mountains, where they are tapering off to the level land. In all there will be two or three of such ascents, none of which will offer any difficulty. Once up these grades it is practically easy going to Little Rock. This territory offers an excellent car market, the pathfinders reporting many towns along the route in which five cars were owned in 1909 and already forty-two or more have been sold up to date.

The Monday run from Hot Springs to Arkadelphia will be one of the hardest days on the trip. Originally it was to be a trip of 191 miles, but owing to the 60-mile run from Little Rock to Hot Springs being made on Sunday, the Monday trip will be reduced to 131 miles. Of these remaining 131 miles 80 are particularly hilly, these hills ranging from one-quarter to one-eighth mile in length and some with grades as high as 20 per cent. This is one of the poorest selling sections of the trip, the country being wooded nearly all of the way. Once Arkadelphia is passed the troubles of the tour are over, so far as roads are concerned, the remainder of the run to Chicago being through continuous agricultural territory. To Texarkana the road is level, and through a cotton and corn country.

At Texarkana, which is on the State line between Arkansas and Texas, the State line passes through the middle of the main street, so that to satisfy the natives half of the cars will be parked on the Arkansas side of the line and the other half on the Texas side. For some miles out of Texarkana some stumps will be encountered on the road, but after Paris is passed, it is nothing but a perfectly level road to Dallas. Pathfinder Lewis reports that the boulevard leading 25 miles into Dallas is one of the most perfect roads encountered. From Dallas to Fort Worth, 32 miles, is a boulevard through corn and cotton country.

From a standpoint of the products of the country the tourists will be treated to a variety of conditions. Through Kentucky the tobacco and stock-raising territory will be seen; in Tennessee the leading products are corn and tobacco; across Arkansas the rice territory will offer particular interest; in Texas cotton and corn are the leading products; and from this point north the tourists will be continually in the great grain-producing center of the country.

A commendable feature of the tour this year will be a half hour noon stop each day at which time the members of the tour will have an opportunity of meeting the people en route, and those manufacturers who accompany the tour will have an opportunity of studying local conditions. The following noon stops will be made: First day, Lexington, second day, Bowling Green, third day, Columbia, fourth day, Corinth, fifth day, Clarendon, sixth day, Arkadelphia, seventh day, Paris, eighth day, Terrell, ninth day, El Reno and Chickasha, tenth day, Enid, eleventh day, Emporia, twelfth day, Marysville, thirteenth day, Guthrie Center, fourteenth day, Cedar Rapids and last day, Rochelle.

Of Interest to Wisconsin Motordom

MILWAUKEE, May 16—Motions to dismiss the suit of the Velie Motor Vehicle Co. of Moline, Ill., have been filed in the circuit court at Milwaukee in behalf of twenty-six of the fifty-five A. L. A. M. concerns made defendants in the action to recover $500,000 damages on charges of conspiracy in restraint of trade and to ruin the plaintiff company. The twenty-six defendants contend that the action was not brought in the proper manner and that service of summons was faulty. All of the defendants making the motion to dismiss the suit are not legally represented in Wisconsin. Service was made on agents representing their products in Milwaukee, when under the law, service must be made personally. The motion was filed by Quarles, Spence & Quarles, attorneys, Milwaukee. Arguments will be heard by Judge W. J. Turner on May 21 at Milwaukee.

Quarles, Spence & Quarles are now preparing briefs for the remaining companies and these will be filed in two or three weeks' time. The nature of the answers is not known and no information on this point will be permitted to escape before the day of filing the papers.

For 1911 the Kissel company plans to build an electric car and a line of motor trucks and delivery wagons, in addition to the line of gasoline pleasure cars now built in eleven models.

The only information given out regarding the new Kissel electric is that it will be produced in large quantities for next year and will be a shaft-drive car.

The ranks of the Wisconsin State Automobile Association, have been strengthened by the addition of another club, the Oakfield Automobile Club. This organization is composed of owners at Oakfield, South Byron and Brownsville in, Fond du Lac County, Wis. The club has twenty-two charter members. The officers are: President, Dr. C. H. Moore; vice-president, W. C. Ehrhardt; second vice-president, Henry McCarty; secretary, W. E. Bristol; treasurer, George Hansen. It was decided to hold meetings each month. Good roads and checking of law violations are two important aims of the club.

Charles L. McIntosh, of Milwaukee, Wis., president of the Pierce Motor Co., of Racine, Wis., and other corporations, who died at Naples, Italy, recently, left an estate valued at $300,000. The bulk of estate is put in trust for the children and their issue. The will was filed at Milwaukee on May 13.

The Wisconsin Automobile Radiator Co. has been incorporated by Milwaukee capital with a stock of $50,000. The incorporators are: H. Gerhard Aussen, S. S. Land and Arthur Zancing.

The Mitchell-Lewis Motor Co. of Racine, Wis., made a shipment of two Mitchells to Antwerp, Belgium, one day last week. Foreign shipments are now almost a daily occurrence.

Arthur N. McGeoch is building a fine private garage at West Allis. The building is 58 by 24 feet in dimensions set in a miniature park, part of the McGeoch estate. The building will be of concrete, ornamentally designed.

The State of Wisconsin has started another suit to test the constitutionality of the oil inspecion law, by making Thomas B. Jeffery & Co., of Kenosha, Wis., and individual officers of the corporation defendants. Chief Oil Inspector is trying to collect fees for testing 686 barrels of gasoline purchased by the Rambler concern for its own use. Experts for the company declared the tests to be valueless.

Fine Trophy for Wisconsin Tour

MILWAUKEE, May 16—The accompanying cut shows the beautiful silver trophy donated by Charles F. Pfister, proprietor of The Milwaukee *Sentinel*, to the Wisconsin State Automobile Association. The cup will be awarded to the winner of an annual reliability tour, and will be held by him until the succeeding year. It is a permanent or perpetual trophy. It is known as the "Milwaukee Sentinel Trophy."

The cup stands twenty-four inches high and is eighteen inches wide at its greatest breadth. It is of solid silver, the bell being finished in gold. Beyond the usual lettering of the inscription, there is no engraving on the cup, all figures being done in high bas-relief. The cost was more than $600.

"Sentinel" Trophy for Milwaukee Run

The Rambler has been selected as official pathfinder for the tour.

Matthew C. Moore, president of the Wisconsin State A. A., who was appointed official pathfinder, will leave Milwaukee May 18 or 19 and will attempt to make the trip in schedule time of five days. The tour will start July 18 and end in the evening of July 23. The A. A. A. has sanctioned the tour.

George A. West, believes that more than seventy-five cars will be nominated.

State Association in Tennessee

NASHVILLE, May 16—President H. S. Probasco, of the Chattanooga Automobile Club, the oldest organization of the kind in the State, has been authorized to take up with other cities of the State the question of organizing a State Club. Delegates will be sent to some one of the cities at a date to be named later and the club will be launched for the purpose of cementing the automobile interests.

The Nashville Automobile Club will meet this week and finish its organization. It is the wish of the local club to co-operate with counties in Tennessee and Kentucky to improve the highway along the route of the Glidden Tour.

Maryland Hill Climb June 11

BALTIMORE, MD., May 16—It was decided at the meeting of the Automobile Club of Maryland that the date for the hill climbing contest will be June 11. Chairman Joel Nassauer announced that the Belvidere Hill, extending from Roland avenue to the Falls road, had been selected for the event. This is one of the steepest hills in this vicinity outside the city limits and was used two years ago when a successful hill climb was given under the club auspices. There will be ten events. The official entry blanks were posted last Friday.

"Little" Glidden Pathfinders

MINNEAPOLIS, May 16—The pathfinder car of the "Little" Glidden tour, for the St. Paul *Dispatch* trophy, left St. Paul Saturday afternoon. The car is an E-M-F "30" and was driven by T. M. Skeggs. From St. Paul the road was to Northfield, to Faribault, 25 miles and from Faribault to the first stopping point, Owatonna, 34 miles farther.

Trucks Will Climb Dead Horse

COMMERCIAL cars and trucks will have a chance to show their paces in the line of hill climbing when the Worcester Automobile Club conducts its contest on Dead Horse Hill, June 4. Twenty events are on the program and one of them is solely for the commercial vehicles.

The full list of events is as follows:

Class "A."—Open to any gasoline motor car (other than motor cars with solid tires, wheels 36 inches in diameter and over) which complies with the definition "stock car," this class to be run in the following divisions:

1A. $4,000 and over.
2A. $3,001 to $4,000.
3A. $2,001 to $3,000.
4A. $1,601 to $2,000.
5A. $1,201 to $1,600.
6A. $801 to $1,200.
7A. $800 and under.
8. Open to all makes of motor cycles.
9. Free for All. Open to cars of all types and motive power.
10. Amateur Event. Owners to drive. Worcester County Championship for trophy to be won 3 times in succession.

Class "B."—Open to any chassis of a gasoline car which is in accordance with the definition of a "stock chassis"; to be governed by the following table of piston displacement and minimum chassis weights:

	Piston Displacement in Cubic Inches.	Minimum Weight in Pounds.
11B.	160 and under	1,100
12B.	161 to 230	1,400
13B.	231 to 300	1,700
14B.	301 to 450	2,000
15B.	451 to 600	2,300
16B.	601 to 750	2,500

17. Open to commercial cars and trucks. Details to be announced later.
18. Free for all gasoline stock cars only.
19. Record of hill.
20. Amateur Event. Gasoline cars only; no limitation as to territory.

J. P. Coghlin, chairman of the hill climb committee, will be in charge of the event. Fred J. Wagner will wield the starter's flag. Prof. D. L. Gallup, of the Worcester Polytechnic Institute, will have charge of the timing.

Many Enter Norristown Run

NORRISTOWN, PA., May 17—With thirty entries in the various manufacturers' classes and a total entry list of fifty-five automobiles in the reliability run of the Norristown Automobile Club which starts tomorrow on a two-day tour to Scranton and return, will be an event of notable size.

The itinerary of the first day will be 150.8 miles. The night stop will be at the Hotel Jermyn, at Scranton, and the return trip will be 175.8 miles. The technical requirements of the tour are severe and the course is specially adapted to give the cars a thorough test. The entry list includes:

Class A—Touring cars, valued at $2,001 and over:—		Class C—Runabouts valued at $2,001 and over:—	
Pullman	Selden	Alco	Jackson
Franklin	Matheson	Palmer-Singer	Buick
Pullman	Kline	Knox	Premier
Class B—Touring cars, valued at $2,000 and under:—		**Class D—Runabouts, valued at $2,000 and under:—**	
Regal-Detroit	Inter-State	Warren-Detroit	Mitchell
Inter-State	Enger	Ford	Overland
Regal-Detroit	E-M-F	Ford	Parry
Maxwell.	Kline		

Georgia Car Wins Hill Climb

DUBLIN, GA., May 16.—The automobile hill-climbing contest was won by a White Star, a Georgia-made car. The contest took place at Turkey Creek hill, one of the hardest in Laurens county to climb, and was made from a flying start on the last bridge on the western side of the creek. C. W. Brantley and Frank N. Watkins were the official timekeepers. The winner was driven by Charles Eberlein. Following are the records: Buick, R. L. Miller, 37 sec.; White, Marshall, 37 sec.; Ohio, Sam Bashinski, 40 sec.; E.M.F., Marshall, 42 sec.

Continental Tires on Winners

One of the interesting places at the recent 24-hour race at Brighton Beach was the camp of the Continental tire outfit. The winning Simplex car and the Stearns that finished second, both used these tires, the former traveling fifteen hours on one of its set. Changes were made with the demountable rim in some instances in less than a minute.

The Selden car, equipped wih the Continental heavy, flat tread, experienced no tire trouble throughout the race to one of its set.

Isotta Won Coast Road Race

COALINGA, CAL., May 9, Special Telegram—In a field of eight an Isotta won the 105-mile road race here to-day by a lead of about 30 miles over the second car. The Isotta, Marquise driving, negotiated the distance in 2 hours, 15 minutes and 6 seconds. A Buick finished second and a Regal third. When the Isotta finished, after having lapped every other car in the race once and sometimes twice, Buick 16, driven by Nikrent, which was second had two laps, or 30 miles yet to do. The distance of each lap in this race was about 15 miles over rough roads. The entries included the Pope-Hartford, Elmore, Isotta, Regal, Winton, two Buicks and a Mitchell. On the preceding day a Winton six, Free driving and starting seventh in a field of eight, won the Fresno-Coalinga road race in 1 hour, 11 minutes, 43 seconds, clipping 13 minutes off the record held by the Buick. The distance between the towns was 64 miles. Murray in a Buick blinded by the dust crashed into the rear end of a touring car. The car was wrecked but he escaped with bruises about the head.

Pullman Makes Good on Road

The showing of the Pullman model K entry in the recent Harrisburg run to Atlantic City, which made a clean score in Class A and which will get the chief trophy in that class, has been gratifying to the manufacturers. The run was accomplished in rain during two days and road conditions were such that the stability of the contestants received a thorough test.

Continental Tire Camp at Recent Brighton Beach 24-Hour Race

Characteristics of Model 38 Overland

(*Continued from page 931.*)

valve V is ready at hand when it is desired to light up. There are many other points of interest which might be brought out, which will be reserved for some more propitious time, but it will be in order to state the main dimensions of Model 38 before concluding this effort.

The car sells for $1,000, and has a motor which is rated at 30 horsepower. The cylinders, of which there are four, have a bore of 3¾, and a stroke of 4½ inches. The motor is water-cooled, works 4-cycle, has a celluloid type radiator, no water pump, and the individual cylinder construction, together with other notable features of design, rather leads to the conclusion that the expertness of the driver is in small demand. Ignition is effected by magneto; a coil and battery auxiliary will serve during cranking, and should some other occasion arise. Ordinarily, this model is fitted out as a runabout, but for this occasion it was necessary to make provision for the long trip, and Fig. 1 shows how this matter was attended to. Quite a little storage room for tools and "togs" was provided in a simple and secure manner.

With all the eclat of a social function, Miss Blanche Stuart Scott in her Overland 38 commenced her long tour from New York to San Francisco Monday afternoon. Miss Scott undertakes the trip without male help of any sort and is accompanied by a girl friend only. The trim car, white-painted and bearing the sign "The Girl, the Car, and the Wide World," attracted a vast amount of attention in the preliminary run and Miss Scott was called upon to acknowledge numerous greetings.

The tour is unusual in that it is the first of its kind ever undertaken by a woman. She is brim full of enthusiasm and confidence and the anticipation of any big obstacles is apparently far away from her thoughts.

Miss Scott was tendered a luncheon at the Hotel Claremont before the official commencement of the trip. The guests included representatives of the press and the Overland company and everybody joined in wishing the voyager good luck and a pleasant trip. About 3 o'clock, the young woman cranked her motor and stepping into the car with her friend, turned its radiator northward. Waving goodbye to the assembly, she was off on the first leg of the tour that may take months to finish.

There is to be no definite itinerary or time limit. The fair driver can be as leisurely as she pleases; the only condition involved in the trip being that she shall receive no assistance from male persons along the way in the shape of repair work.

Her first objective point is to be Albany and from thence her course will be westward along the South shore of Lake Erie. Between here and Chicago five automobile clubs are preparing to receive the tourists and entertainments at numerous country clubs by the women of half a dozen cities are being arranged.

In reply to the good wishes expressed by the guests at luncheon, Miss Scott said: "It's starting in a pleasure jaunt but we are going through."

Metropolitan Automobile Guide Is Progressing

The growing demand for specific touring information for the use of those owning or operating cars in the neighborhood of New York City has induced the Automobile Blue Book Publishing Company, 231 West 39th Street, New York City, to bring out a second edition of the well-known metropolitan automobile guide. The new volume will be brought up to date in every particular, and last week the three Blue Book cars, Nos. 1, 2 and 3 started out in different directions to prepare route matter for the new book. The book will be limited to one and two-day trips around New York City trips that can be enjoyed on a Saturday and Sunday run. In every case possible every trip will have the return route by other roads than those taken on the trip out, and particular effort will be made to describe routes that will make the various trips real outings. The new book will be gotten up in the usual high-class Blue Book style.

A. L. A. M. Tire Committee to Meet

One result of the big meeting of the A. L. A. M. earlier this month has been the calling of a meeting of the tire committee of that organization for May 24. At this meeting the tire committee will consider general and detailed plans for avoiding difficulty arising out of the present state of the crude rubber market as it applies to the problem of tires for 1911.

The attitude of the manufacturers as expressed at the meeting was amicable toward the rubber men and it was freely predicted after adjournment that a working basis would be found upon which both factors would be able to work.

Three More in United States Motor Company

Another series of mergers has developed this week, affecting the United States Motor Company. The Gray Motor Company, of Detroit, makers of marine and stationary engines, the Brush Runabout Company and the Briscoe Manufacturing Company, both of Detroit, have been added to the United States Motor Company.

Worcester Show Attracts Entries

WORCESTER, MASS., May 16—Thirteen automobile entries have been received for the Horse, Auto and Motorcycle Show to be held at the Sturbridge fair grounds, Saturday, May 21, under the auspices of Southbridge and Worcester autoists and horsemen. It is the intention of the committee in charge of the show to run several automobile races over the broad half mile track of the fair grounds, providing contestants can be entered before next Thursday night.

Among the entries so far received, the following makes are represented: Franklin, Buick, Overland, Matheson, Chalmers, Knox, E-M-F "30," Ford, Flanders, Peerless, Hudson, and several others.

Southern Interest Keyed Up

NASHVILLE, TENN., April 25—Increased interest in automobiling, the formation of more auto clubs, and the recent visit of the official pathfinder of the Glidden Tour have aroused interest throughout Tennessee in good roads and the various sections are bestirring themselves looking to material improvement in the roads of the State.

Fast Time on Cheyenne Speedway

CHEYENNE, May 16—Fast work was done on the 4-mile circular speedway at the meet last week when Oldfield with a Benz car went a half mile in 17 seconds and the full mile in 36 seconds. The Knox, Darracq and a number of local cars competed. The course is so large that a mile straightaway is possible.

Joins Staff of MacManus-Kelley

Charles E. Jones, advertising expert, who has been identified with Chicago and New York agencies for several years has been added to the staff of the MacManus-Kelley Company, Detroit. Mr. Jones will engage in the automobile advertising section of the concern's activities.

Official Report of Around New Jersey Run

The labors of the checkers of the Around New Jersey Reliability Run are completed and the report is to stand as here given. There are so many perfect scores that, as W. J. Morgan puts it, the one gold medal for the first prize will not go around, and it is suggested that the tie be disposed of by "drawing." If the matter is disposed of in this way, the remaining perfect score cars will be given replica medals. The second and third prizes are in the form of silver and bronze medals respectively. The Motor Contest Association states that the run, taking it on the whole, was a huge success.

CLASS 1A, $800 AND UNDER

Car	Driver	Score	Penalties Imposed For
Hupmobile	R. E. Gillam	Perfect	
Hupmobile	Elmer A. Cutting	9	Oil & Water Replenishment
CLASS 3A, $1,201 TO $1,600			
Regal	W. H. Bowers	Perfect	
Overland	Geo. L. Reiss	Perfect	
Maxwell	W. Mulstay	1	Stalled motor
Buick	W. C. Davenport	191	Broken spring & w't'r r'pl'nishm't
Cole "30"	F. Warmington	1,000	Out—Accident
CLASS 4A, $1,601 TO $2,000			
Pierce-Racine	Lewis Strang	Perfect	
Auburn	Herbert F. Earl	Perfect	
Franklin	Paul Harvey	Perfect	
Chalmers	Joseph Bell	Perfect	
Koehler	J. L. Bryer	1,000	Out—Accident
Marion	Wm. F. Bradley	Perfect	
Cadillac	N. L. Lichtenberg	Perfect	
Cadillac	L. R. Burne	Perfect	
Midland	Leo Anderson	Perfect	
Maxwell	Chas. Schaeffer	3	Gasoline r'pl'm't
Brush	Phil Hines	1	Closing pet cock on drip'ng carb.
CLASS 5A, $2,001 TO $3,000			
Stoddard-Dayton	Richard Newton	Perfect	
National	W. C. Poertner	Perfect	
Mitchell	O. R. Delamater	Perfect	
Mora	Chas. Hinman	Perfect	
Glide	W. H. Foltz		Disqual. at start
Mercer	Joe Trepon	Perfect	
CLASS 6A, $3,001 TO $4,000			
Franklin	Chas. F. Fox,	Perfect	
Welch-Detroit	Robt. M. Flagg	2	Sticking valve
Croxton-Keeton	Wm. C. Spenny	21	Dirt in Carbur.
Matheson	Neil Whalen	Perfect	
Haynes	W. Shuttleworth	1,051	Br'k'n clutch fin.
CLASS 7A, $4,001 AND OVER			
Zust	Jos. Kingsland	41	Carbureter adj.
Zust	V. P. Pisani	Perfect	

Orphans' Day Promises Well

Fifty Pierce-Arrows, fifty Chalmers and fifty Buicks have been definitely donated so far to the Orphans' Day committee for use in the parade of the children to Coney Island. These cars will move in divisions freighted down with joyful kiddies as part of the procession which will stretch from the City Hall to Herald Square. Another division is being formed to consist exclusively of Packard cars, but all details are not complete.

The total number of cars donated to date is 182, but that number will be vastly augmented before the event is held. It is planned to accommodate all the 4,000 orphans who have made application and in the event of success, the occasion will be the greatest in the history of the Orphan Day movement.

With characteristic energy, the Long Island Automobile Club is working to make Orphans' Day the biggest success ever scored by that club. Personal appeals to car owners have been sent out by the officers of the club and returns so far have been gratifying. The outing has been set for June 7 and will include a trip to Coney Island, luncheon and informal feasting for the children and a good time in the show place.

Warren Motor Company Dines

DETROIT, May 9.—Officers of the Warren Motor Car Co. were hosts at an informal banquet in the Tuller Hotel, Friday night, the guests being the department heads. General Manager Bayerline presided as toastmaster.

One-minute speeches were made by secretary Allen, superintendent Bollinger, sales manager Wilson, chief engineer W. H. Radford, and forman J. Mohardt and others.

Twenty-one in Connecticut Run

HARTFORD, May 17—Twenty-one cars have been entered for the three-day, 600-mile reliability run of the Automobile Club of Hartford, which starts Thursday.

The first day's run will be through Litchfield county as far as the New York and Massachusetts state lines. The first leg extends as far south as New Milford.

The second leg is through the southwestern section of the state as far as Stamford, while the third day will be given up to the territory east of the Connecticut River. The following entries have been received:

No. 1—Chalmers-Detroit, Carl H. Page & Co., New York, Class 3.
No. 2—Chalmers-Detroit, Carl H. Page & Co., New York, Class 5.
No. 3—Franklin, S. C. Hutchins, Hartford, Class 4.
No. 4—Regal, Regal-Detroit Auto Co., New York, Class 4.
No. 5—Cartercar, W. S. Williamson, New York City, Class 2.
No. 6—Cartercar, W. S. Williamson, New York City, Class 3.
No. 7—Corbin, Corbin Motor Vehicle Corporation, New Britain, Class 5.
No. 8—National, Fred T. Reid, Hartford, Class 5.
No. 9—Jackson, Kilby & Barrett Auto Sales Co., Hartford, Class 3.
No. 10—Franklin, H. H. Franklin Manufacturing Co., Syracuse, N. Y., Class 6.
No. 11—National, Portner Motor Car Co., New York, Class 5.
No. 12—Reo, N. B. Whitfield, New Haven, Class 3.
No. 14—Auburn, La Due Carmer Motor Co., New York, Class 4.
No. 15—Speedwell, Rantz Motor Car Co., Bridgeport, Class 5.
No. 16—Columbia, Columbia Motor Car Co., Hartford, Class 5.
No. 17—Interstate, Holcomb Co., New Haven, Class 4.
No. 18—Franklin, Holcomb Co., New Haven, Class 5.
No. 19—Pierce-Racine, Volney J. Jacobs, Boston, Class 4.
No. 20—Lexington, Nock Auto Co., Inc., Providence, R. I., Willis H. Brow, Class 5.
No. 21—Tiley, C. B., Tiley, Essex, Class 5A.
No. 22—Overland, Fairfield Auto Co., Bridgeport, Class 2A.

Touring Around United States Borders

About a month ago an automobile made by the Inter-State Automobile Company of Muncie, Ind., left the factory on a tour of 25,000 miles all around the borders of the United States. C. L. Welch is driving the car and so far as he has progressed, the trip has been most trying.

The plan was to cross the mountains to Vancouver, B. C., and then proceed to San Francisco and on to Los Angeles. Then strike back into the mountains again and traversing the desert country and the Southern states to the Atlantic seaboard. Following the coast line and back to New York, make the comparatively easy run back to Muncie.

Motor News Makes Its Debut

A new automobile publication, *The Motor News*, house organ of the Premier Motor Mfg. Co., has made its appearance. It is a monthly and in size approximates the style of a daily newspaper. The paper is heavy and highly sized, so that cuts make an excellent impression. The material used in the first issue is largely taken from the daily press special articles and is well edited and put together.

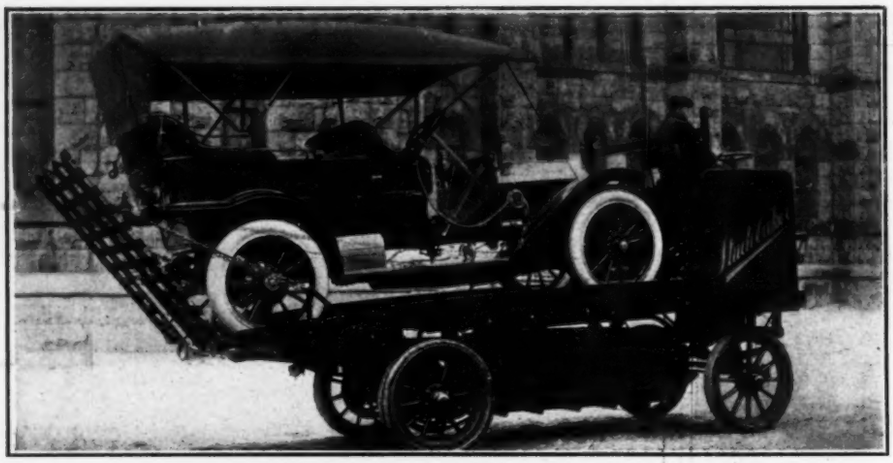
Ohio Senator Feels Law's Power

COLUMBUS, O., Apr. 25—The arrest of State Senator Baker of Cincinnati by a Columbus policeman on the charge of operating his motor car without displaying the necessary lights caused quite a stir. According to the state constitution a member of the legislature can not be arrested while the legislature is in session except for treason, a felony or disturbing the peace.

The police prosecutor refused to file an affidavit and the case never came to trial.

Federal Registration Progress

WASHINGTON, May 9—Prospects for the passage of the federal registration bill are said to be bright. The petition of Chicago motorists, was presented to the Committee on Interstate and Foreign Commerce this week.



An example of the utility of the modern big truck. Studebaker five-ton truck hauling Studebaker touring car through the streets of New York

In the Realm of the Makers

Cleveland Automobile Spring Company, of Cleveland, O., was incorporated with a capital stock of $2,000 to manufacture motor car springs.

Akron Inner Tube Company, which will manufacture inner tubes exclusively, is erecting a factory. The preliminary capital of the concern is $10,000.

M. D. Coate, Cleveland Ford manager, reports that there will be a convention of Ford dealers of northern Ohio in Youngstown, Tuesday, May 10.

The Fry Manufacturing Company, a concern organized to control the manufacture and sale of the Fry plug, is located at 1779 Broadway, New York City.

The Miller Rubber Company, of Akron, O., has increased its capital stock from $250,000 to $500,000. The company has doubled its capacity during the past year.

The Brown Auto Carriage Company, builders of special bodies for any automobile, moved to new quarters at Thirty-second street and Superior avenue, Cleveland.

The Baker Motor Vehicle Company has moved into its handsome new building in Cleveland, Ohio, situated in the most fashionable and exclusive part of Euclid avenue.

The Sandusky Auto Parts and Motor Truck Company, of Sandusky, O., has been incorporated with a capital of $15,000 to manufacture parts of automobiles, and especially motor trucks.

The Reliance Motor Truck Company, Owosso, Mich., has purchased the land on which to build additional shops, 750 feet long and two stories high, for the manufacture of truck bodies.

The Dayton Rubber Manufacturing Company has decided to increase its capital stock from $150,000 to $500,000 in order to provide for enlarged and augmented facilities for manufacture.

The Cass Motor Company, manufacturing the Cass power truck, will locate in Port Huron, Mich. The concern will occupy the old Grand Trunk shops and employ upward of 6000 men.

Plans are now in the hands of Lansing architects for more buildings at the Reo Motor Car Company's plant, on Washington street south, and it is probable that the work will be begun this summer.

The Monitor Automobile Works have removed from Chicago to Janesville, Wis. The new plant has a floor space of 75,000 square feet, which is a material increase over what was formerly occupied.

The new plant of the Auto Wheel Company at Lansing, Mich., is nearing the stage when machinery can be set in motion. It is expected that the company will be ready for business in about a month.

Work is progressing on the addition of the Buckeye Wheel Company's plant at Galion, Ohio. The new building will be used to house the department devoted to the making of automobile wheels.

The Whitney Manufacturing Company plans for immediate construction of a five-story addition to the present big plant in Hartford, which is to be completed and ready for occupancy by October 1.

Biddle & Smart Company, Amesbury, Mass., are erecting a large addition to their present plant. It will be completed July 1 and will be equipped with machinery for the manufacture of wood and metal bodies.

The Archer Automobile Association announces that it is about ready to place on the market a roadster, four-cylinder, two-cycle, thirty-horsepower, lightweight car. The company's headquarters are at Burlington, Vt.

The Standard Specialty Company, of Cleveland, was incorporated with a capital of $10,000 to manufacture automobile accessories by Harry Dolitz, Cornelius Sheehan, Leo J. Kellosky, Charles M. Robertson and Louis M. Kleinhenz.

The Lowell Auto Body Company has begun the manufacture of automobile bodies in its new plant recently erected in Lansing. The new factory is a substantial two-story brick structure and is equipped with the latest patterns of machinery.

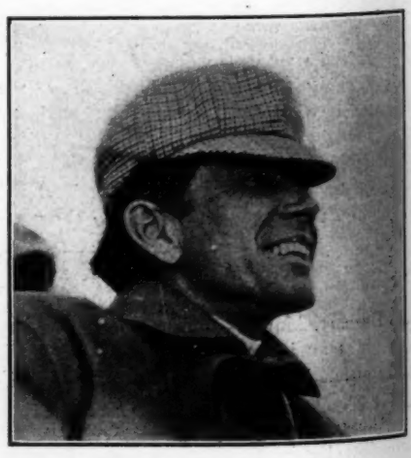
More automobiles were sold in the United States during the thirty-one days of the month of March than in any corresponding period in the history of the automobile industry, according to reports received from many factories now working overtime.

Ionia Wagon Company, which went into the hands of a receiver some time ago, has been sold to the Hayes Ionia Auto Body Company for $70,000. The company already has machinery on the ground, and this will be installed at once. The company has a successful plant at Detroit.

The Universal Tire Protector Co., Angola, Ind., has been reorganized with a capital stock of $30,000 fully paid ,the officers being S. C. Wolfe, president; E. S. Croxton, vice-president; J. R. Nyce, secretary, and W. W. Love, treasurer. Mr. Croxton is vice-president of the First National Bank of Angola.

Crowds at Minot's First Show

MINOT, N. D., May 16—The first automobile show ever held in the city has proved surprisingly successful. The show closed last week after enjoying patronage that was satisfactory to the management. The exhibit contained several varieties of well-known cars and quite a large display of parts and accessories. The exhibitors were mostly local agencies and included the following: J. F. Koppin, Minot; C. Foss, Minot; Scofield & Robinson, Minot; Dr. R. W. Pence, Minot; D. Dorman, Minot; More Bros., Fargo and Wimbledon; Abbott-Detroit Motor Car Agency, Minot; Jacobson Implement Company, Minot; Motor Inn Company, Minot, and A. Belzer, Minot. The enterprise had the support of the Minot Commercial Club.



W. C. Durant, of General Motors Company, New York

The Connecticut Shock Absorber Company, of Meriden, Conn., has purchased the tools, dies and stock of the Sager Shock Absorber Company. The former concern announces that the reason for the retirement of the Sager company is that its device was an infringement of the patents held by them.

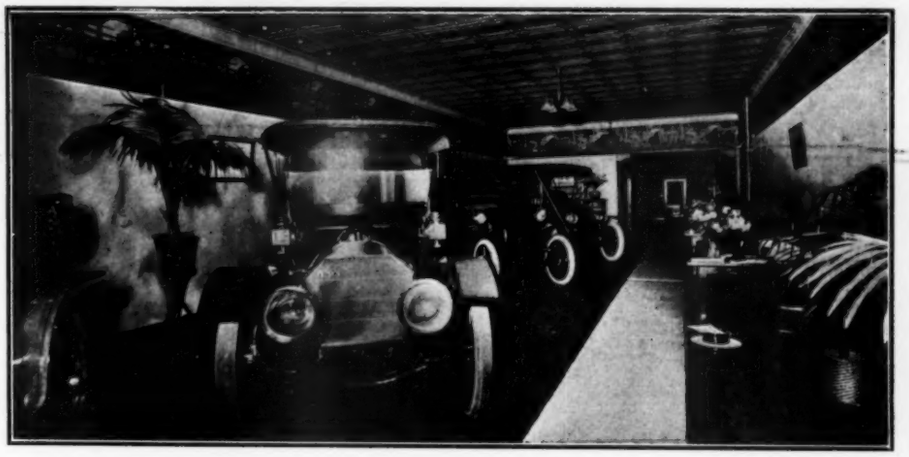
Harry W. Cleveland, of Fond du Lac, Wis., has completed his first full-sized model of a new pleasure car, "The Oriole," which is entirely successful; it will be manufactured by the Giddings & Lewis Manufacturing Company, of Fond du Lac. Cleveland is a son of C. E. Cleveland, president of the big machinery concern.

With new officers and a thorough housecleaning, the reorganized Berkshire Auto Car Company of Pittsfield, Mass., is entering the field with energy. It is planned to develop the undertaking to its highest point and to widen the market for the product. James Addison is president and treasurer; Stuart Clapp, vice-president, and E. B. Belcher, construction engineer.

The annual meeting and election of the Hartford Rubber Works Mutual Benefit Association resulted as follows: President, C. B. Whittlesey; vice-president, George Holloway; secretary, A. Elmer; treasurer, E. Fothergill. During the past three years there has been paid out in benefits to members $5,000 in cases of sickness and death. The association has a membership of 500.

A consolidation of the Standard Gauge Steel Company and the Standard Connecting Rod Company, of Beaver Falls, Pa., has been effected. The new corporation will be known as the Standard Gauge Steel Company. By the merger facilities will be improved and capacity increased. The full lines made by each of the companies interested will be continued and others under consideration added. The management will be practically the same as it has been in both corporations.

A. L. Riker, chief engineer, Locomobile Company of America



New salesroom of the Cook & Stoddard Company, at Washington, D. C., dealers in Pierce-Arrow cars, opened the first of April

The Vivax Storage Battery Company, 2228 Michigan Boulevard, Chicago, has succeeded to the manufacture of the DurO line of storage batteries for automobile ignition and lighting. W. R. Gibbs, for years the president and general manager of the DurO battery, has decided to make his home in the East.

The New Departure Manufacturing Company, of Bristol, Conn., is making additions to the big plant, which will afford an increase in floor space of 32,000 square feet. The foundations have also been laid for additional gas-engine equipment. Gas engines have been used by the company for power purposes for some time with good results.

An addition to the Moon Motor Car Company factory is now being built for the accommodation of the increased number of cars in the testing stage. The test cars, while undergoing their road test preparatory to the 200-mile perfect score run, which each must take before it is sent to the paint shop, will be housed in the new department, to be known as the test-car garage. The garage will be large enough to accommodate thirty to forty cars. It is being built in the quadrangle formed by the three wings of the big plant and a high fence topped with barbed wire. The new department will be ready for occupancy in April.

Among the Various Agencies

F. T. Reed has taken the Hartford agency for the National.

The Pierce-Arrow has been taken on by the Savannah Motor Car Company.

W. B. Worley, of Jacksonville, Fla., has secured the State agency for the Hupmobile.

The Republic Tire Agency in Buffalo has moved from 46 West Chippewa street to 908 Main street.

A Boston agency for Rauch & Lang electrics has been opened by H. C. & C. D. Castle, who handle the Lozier car.

The Savannah Taxicab Company has been appointed representative for the "Empire 20" and the "Page-Detroit."

McPherson & Waterbury, Plattsburg, N. Y., manager of the New Garage, have been given the agency for the Cole "30."

Hugh Miller has taken the agency in Cleveland for the Palmer & Singer line and opened headquarters at 6506 Euclid avenue.

O. S. Johnson has been appointed to succeed R. H. Gillis as manager of the Buffalo agency of the Hartford Rubber Works Company.

The Alden Sampson Manufacturing Company announces the removal of its sales office to 102 West Forty-sixth street, New York.

John W. Frey has opened a store at 698-700 Main street, Buffalo, with a complete line of supplies for motor cars, motorcycles and motor boats.

S. R. Bailey & Company, Amesbury, Mass., manufacturers of the Bailey electric car, opened a branch at 1024 Boylston street, Boston, Mass.

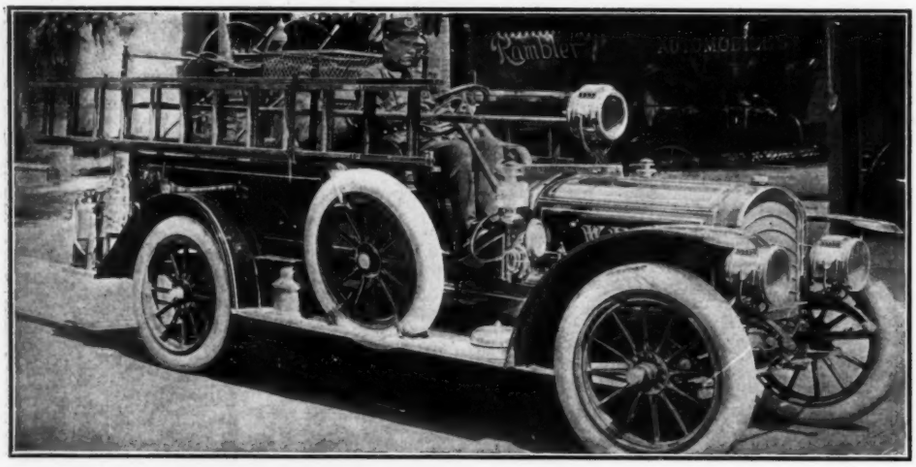
Joseph H. Greenwald, Cleveland agent for Harmon and Moon cars, has just occupied new and larger quarters at 6504 Euclid avenue, Cleveland.

The Foss-Hughes Motor Car Company, agent in Baltimore for the Pierce-Arrow, moved to handsome new quarters, 810 North Charles street.

The Locomobile Agency at Savannah has been given to Carter, Logan & Bro. They have taken it on for several states. A carload of them have been received.

The Parkersburg Motor Car Company, manager, William Caskey, is taking over the business formerly conducted by the Mead Motor Company, on Juliana street.

The Cole car is now located at 289 Berkeley street, near Boylston street, in Boston, the G. E. & H. J. Habich Company having leased salesrooms last week.



The use of motor trucks for various purpose s is growing rapidly on the Western coast. New Rambler chemical delivered to city of Whittier, Cal.

Speedwell Automobile Company, of Pittsburgh, formerly at 5986 Centre avenue, has moved to 5922-5924 Bond street, East End, where it has more than doubled the show room.

H. Heller, of Youngstown, has been appointed Empire and Clark agent for that territory. The Vail Motor Sales Company, of Cleveland, made the arrangements last week.

Oakley Bean has secured the Elmore agency for Jefferson, Clearfield, Indiana, Armstrong and Clarion counties, Pennsylvania, and will have his headquarters at Punxsutawney, Pa.

J. H. Greenwald, agent for the Moon and Marmon cars in Cleveland, has moved his line into a new salesroom and garage. The show room is 140 by 35 feet. Their repair department is almost twice as large.

The Major Motor Car Company, of St. Louis, has obtained the agencies for the Pennsylvania car and the Herreshoff car, and has leased the garage at 1512-1514 Locust street. The garage has been thoroughly remodeled.

H. M. Adams, sales manager of the Royal Tourist Car Company, has appointed the American garage, of Indianapolis, agent for the Royal Tourist line in that city. Demonstrating cars have already been shipped.

Thomas M. Brown, Wilmington, Del., has been given the agency for the Cole "30" for New Castle County, and certain selling rights for the State of Delaware and eastern Maryland, by the Colt-Stratton Company, of New York.

G. E. Lutsey has been re-elected president of the New London (Wis.) Automobile Company. All other officers were re-elected at the annual meeting. It was decided to continue the agency for the Buick and do a general motor livery business.

A. M. Llano has secured the agency for the Petrel car in New York and Long Island and will shortly open salesrooms on Broadway. He has sublet the Brooklyn and Long Island agencies to W. Laubendorf and E. Engrlage.

The Martell Motor Car Company, of which Albert A. Martell is manager, has taken the Eastern Massachusetts agency for the Firestone-Columbus, with temporary headquarters at 3368 Washington street, where he has a big garage.

Ford agents of Ohio held a big convention at Youngstown, O., Tuesday. The meeting was presided over by M. D. Coate, Ohio branch manager of the Ford Motor Company. A street parade of one hundred Ford cars was held.

The Langan and Taylor Storage and Moving Company has installed an automobile department at Garrison avenue and Olive street. The company will act as agent for the Ford, Buick, Speedwell, Apperson, Anhut Six, Cartercar, and other makes.

H. D. Van Brunt, manager of the Buffalo Regal Auto Co., has placed the Regal in two new agencies in western New York. The Genesee Motor Vehicle Co. will handle the car in Rochester, and the W. B. Preston Motor Car Company in Lockport. A recent addition to the force of the Buffalo Regal Auto Company is J. S. Hodge, formerly with the manager of the Buffalo agency when the latter was territory superintendent in western New York for the Olds Motor Company.

Doings of the Garage World

Harry Mitchell and others connected with the Tri-State Garage Company at Uniontown, Pa., have bought from Frank Lewellyn, his garage at 76 East Fayette street, and will use it as an addition to their own plant. Mr. Lewellyn had the agency for the E.-M.-F. car.

C. E. Watson, a well-known engineer of the National Tube Co., is preparing to open an automobile garage in the Leppig Building, Walnut street, McKeesport, Pa. He will handle the Overland and Marmon, and will also carry a full line of accessories.

Stoll Brothers, Mount Pulaski, Ill., are erecting a three-story brick building, the first floor to be used as a garage, the second floor as a display and sales room and the third floor as a public hall.

Work on the construction of the addition to the Widaman garage in Warsaw, Ind., has been commenced. The addition will be 50 feet long and 60 feet wide and two stories high. The second floor will be used as a workshop.

The Franklin Automobile Co. has taken a 15-year lease at 1114 and 1116 Race street, Cincinnati. A two-story and basement concrete and fireproof garage is to be ready for occupancy in a short time. The lot is 38 by 110 feet. The lease involves a rental of about $50,000 for the term, including the fixed charges.

The Saurer truck, eastern branch, has closed a lease on a new six-story and basement fireproof building 50 by 100 at 411-413 West Fifty-fifth street, New York. This building will be devoted entirely to shops, stock, storage and garaging. The main office, however, will still remain at 1876 Broadway.

Brief Personal Mention

Fred Kamp, formerly with O. N. Beebe, of Hartford, has accepted a position with Frederick A. Smith & Company, 1777 Broadway, New York.

H. H. Leckler, for sometime past a salesman for the F. B. Stearns Company, at Cleveland, has joined the forces of the Olds-Oakland Company, at Cleveland.

Charles Clifton, of the Pierce-Arrow Motor Company, has been elected first vice-president of the Buffalo Association for the Relief and Control of Tuberculosis.

Harry B. Tuttle, for a long time with the Stoddard-Dayton organization, has accepted a position with the Willys-Overland Company as superintendent of agencies.

F. W. Haines, general manager, Regal Motor Car Company, Detroit

J. H. Wills has been chosen factory manager for the Gaeth Automobile Company, of Cleveland, by George S. Patterson, who recently became general manager of the Gaeth Company.

William S. Duvall has been elected president of the Automobile Club of Washington to succeed H. Chadwick Hunter, who resigned on account of ill health. Mr. Duvall was the first president of the club, which was organized in September, 1905.

Emil Gruenfeldt, chief designer at the plant of the Baker Motor Vehicle Company, has sailed for Europe, where he will spend several months studying foreign methods of automobile construction.

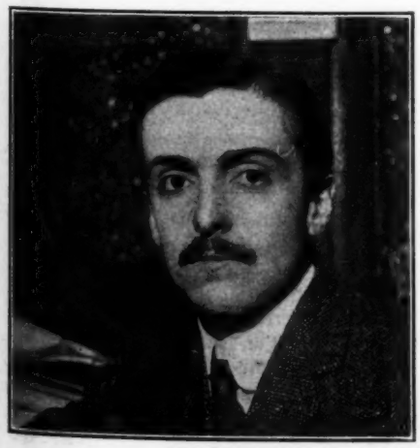
D. P. Thorpe, of Detroit, has associated himself with F. S. Carr Company, of Boston, manufacturers of automobile top materials. He was for many years with H. Scherer & Co., of Detroit.

James B. Fiedler, formerly of the Syracuse Buick truck department and later of the Willis Motor Car Company, has accepted a position as traveling salesman for western New York for the Buffalo Regal Auto Company.

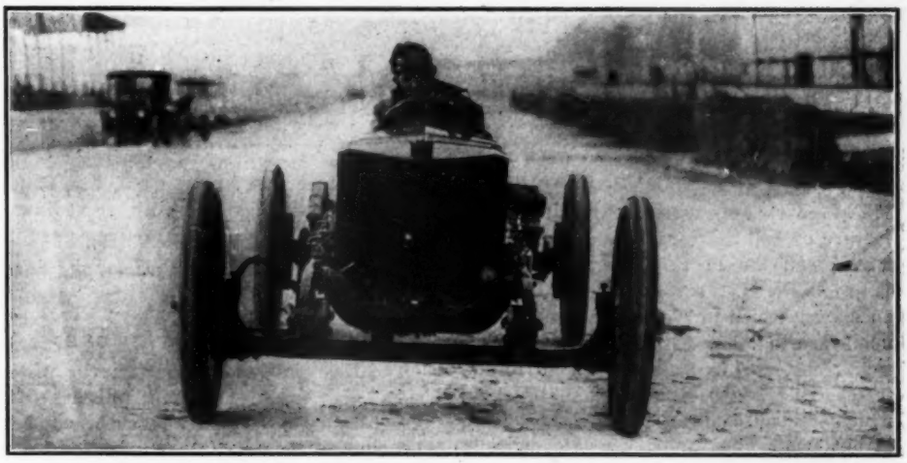
C. W. Hatch, well known in the automobile trade as a salesman of accessories and parts and located in Detroit, Mich., for the past few years, has accepted a position as salesman with the Perfection Spring Company.

Alvan T. Fuller, who handles the Packard cars in Boston, is soon to be married, so it is reported in the Hub. His engagement has been announced to Miss Viola Davenport, a well-known singer, who has been studying to become an opera star.

Several notable changes have been effected in the selling forces of the Royal Tourist Car Company, of Cleveland, Ohio. E. D. Shurmer has taken charge of the selling territory, with Chicago as a center, and will in future devote his entire time to the Western districts. A. D. MacLachlin, the former general sales manager of the company, who has been identified with the Chicago end of the Royal Tourist selling forces, takes a traveling sales managership and will confine his attentions to the East with headquarters in New York. Horace B. Hills, Jr., who is the New York representative of the car, has strengthened his sales forces considerably.



C. R. Mabley, manager, American agency, R. I. V. ball bearings



Marmon Yellow Jacket, wtih wind resistance decreasing body, which has recently proven its utility in automobile racing

News Notes in General

The St. Louis Overland Company has been incorporated to deal in gasoline and electric vehicles. The capital stock is $20,000, of which one-half is paid.

"There would be 5,000 more men employed in Flint in the Buick & Weston-Mott factories if there were enough houses in the city to accommodate them and their families," says C. S. Mott.

Hudson Valley Chauffeurs' Club has been organized at Newburgh with nineteen charter members. The avowed object of the organization is to promote sociability and good-fellowship among the operators.

The A. B. C. Castings Company, of Cleveland, has opened its new foundry at 6515 Carnegie avenue S. E. The plant installed contains the latest equipment and is said to be the largest aluminum foundry in the country under a single roof.

Aldermen of Buffalo have approved the revised ordinances of that city governing public garages. Hereafter it will be necessary to get a permit from the Mayor to conduct such an establishment, and erection of them is made subject to the approval of the Fire Commissioners and Board of Health.

The Holsman Equipment Company has been organized to take care of the repair business of the Holsman Automobile Company, which went into the hands of a receiver last January. The new concern is located in the old Holsman automobile factory, 3600 South Morgan street, Chicago.

D. J. Welton, of Columbus, O., has received a patent on an improvement on the Welton fender, which is manufactured by a Columbus company at Springfield, O. J. W. Howe is general manager of the company. The sale of the fender in Central Ohio is controlled by the Early Motor Car Company.

The Michigan Auto Castings Company will locate a foundry in Pontiac. Ground has been donated by William H. Osmun on Osmun street. Congressman S. W. Smith has wired the promotors that he will subscribe for 5,000 shares of stock. His son, Ferris Smith, has taken 1,000 shares. The capital of the company will be $100,000.

An automobile passenger line, the first of its kind in the Northwest, is to be operated between Minneapolis and Anoka, beginning June 1. The line is to be owned and operated by the Girling Motor Company, which is being incorporated with a capitalization of $25,000. The company has purchased a 16-passenger automobile, which for the first few months will make two trips a day to Anoka and return.

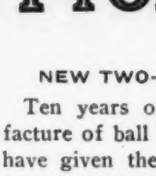
Mayor John F. Fitzgerald, of Boston, and a number of prominent citizens of Boston, Revere, Lynn and Saugus appeared at a hearing before the legislative committee on roads and bridges at Boston last week and advocated the passage of a bill to appropriate $300,000 for the construction of the so-called "missing link" in the North Shore highway from Eliot Circle in the Revere Boulevard to the Lynnway at the Point of Pines bridge.

"Metal Spinning" is the title of bulletin No. 57, from the Industrial Press, 49-55 Lafayette street, New York City. It deals with that ancient art comprehensively, and in view of the scarcity of literature on this subject, not forgetting the importance of metal spinning in the automobile industry, it is a commendable undertaking, and the care with which the material has been prepared is fully up to the customary standard of the publisher. The little work is made up of three articles which were published in "Machinery." The price is 25 cents.

Prominent Automobile Accessories

NEW TWO-POINT BALL BEARING

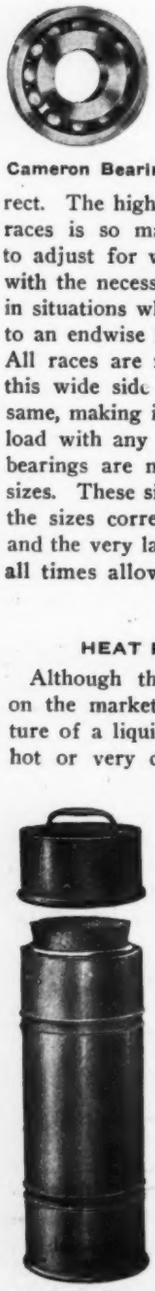
Ten years of experience in the manufacture of ball bearings for automobile use have given the F. F. Cameron Company, Hillsdale, N. H., a sufficient fund of experience from which to evolve not alone a well-made bearing, but a well-designed one as well. The bearing produced, which is illustrated below, is of the two-point type, in which the ball bears on the outer raceways in but two points, and those two opposite one another. The rings are made, both inner and outer, of a special high grade of steel carbonized and hardened so as to give the best results. The balls are of the best imported German make, and are guaranteed to the concern as within 1-1000 in. of being absolutely correct. The high side of the inner and outer races is so made as to make it possible to adjust for wear, thus, also, doing away with the necessity of extra thrust bearings, in situations where the bearing is subjected to an endwise load as well as a radial one. All races are made with very wide sides, this wide side on the races stiffening the same, making it possible to carry a heavier load with any given size of bearing. The bearings are made in all metric and inch sizes. These sizes are interchangeable with the sizes corresponding of other bearings, and the very large stock carried on hand at all times allows quick deliveries.



Cameron Bearing

HEAT RETAINING BOTTLE

Although there are many devices now on the market for retaining the temperature of a liquid just as it is, whether very hot or very cold, for many hours, there is always room for one more. The Icy-Hot bottle, herewith illustrated, is one of these, and now that Summer is coming, with time for long rides into the country, it should be in great demand for carrying the liquid complement to lunches. This form of bottle is made with a vacuum chamber around the central container portion, which vacuum part does not act as a conductor of heat, either from the outside air in or from the inside out. In this way, the dead air space keeps the liquid within at about the same temperature for many hours. Since first brought out, this handy little accessory has met with great favor, and an increasing number of them are sold every year, for just the picnic purpose described above.



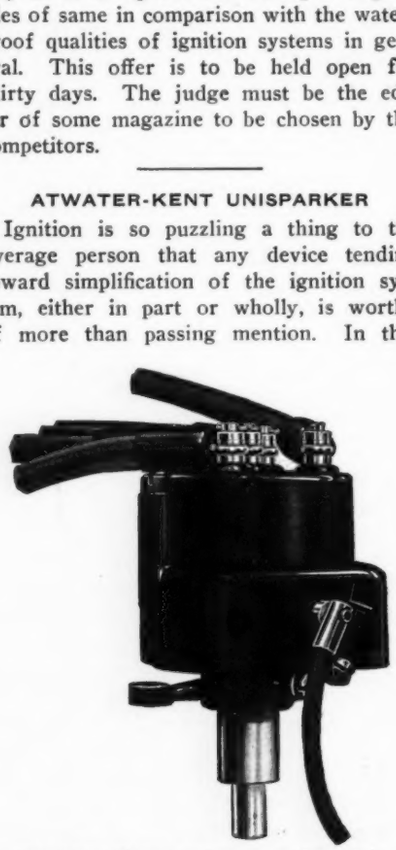
Icy-Hot Bottle

PRIZE CUPS TO CLEVER ONES

The Electric Goods Manufacturing Company, of Canton, Mass., is offering fifty $10 prize cups free to motorboat clubs if the clubs will enter into a contest involving "Prefex" Ignition System, in such a way as to bring out the waterproof qualities of same in comparison with the waterproof qualities of ignition systems in general. This offer is to be held open for thirty days. The judge must be the editor of some magazine to be chosen by the competitors.

ATWATER-KENT UNISPARKER

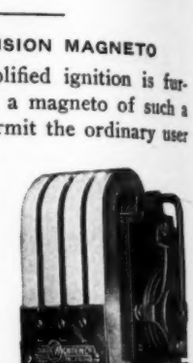
Ignition is so puzzling a thing to the average person that any device tending toward simplification of the ignition system, either in part or wholly, is worthy of more than passing mention. In this device, the same result is brought about as in a magneto or combination of batteries and timer, the whole mechanism being very small and decidedly simple in construction. The claims made for it by the makers include first of all the one just mentioned, that of simplicity. Then, it is claimed to be very saving of power, since but one spark is produced at the exactly correct instant, while other ignition systems produce a number of sparks, the waste of current varying with the number produced. The results obtained are such that batteries which ordinarily last but a few months are made to go through a whole season and more. Thus, it is claimed that as high as 3,500 miles has been made off of one small set of ordinary dry cells, which is remarkable, if possible of duplication by the ordinary user.



Atwater Kent Unisparker Complete

K-W HIGH-TENSION MAGNETO

The cause of simplified ignition is furthered by the use of a magneto of such a construction as to permit the ordinary user to make simple repairs and adjustments. Such a one is the K-W, made by the K-W Ignition Company, of Cleveland. The cut shows model H, a four-magnet type, which may be had for four, six, or eight cylinders. The difference between this and other magnetos lies in the windings, both the primary and secondary windings being circular in form and stationary in position, so that the high-tension current is taken directly from the windings and carried to the distributor without the intervention of a commutator and brush.



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The Flash Mfg. Co., Zanesville, O., reports that the users of Flash Decarbonizer are pleased with the results obtained. Flash comes in cartons, in dry form, and is designed to remove carbon deposits in gas and gasoline engines. The material when in the cylinders combines with such free carbon as may be present, forms a gas as the product of the combination, which is then expelled with the normal products of combustion.

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Any fine tool is worthy of respect, a thing which the ordinary monkey or other wrench seldom gets. The wrenches made by the Coes Wrench Company, Worcester, Mass., are, however, accorded slightly more in this respect than others, for the simple reason that they are very well made, of first-class material, and subject to rigid and numerous inspections.

Coes Wrench

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Empire Automobile Tire Co., Trenton, N. J.
Consolidated Rubber Tire Co., New York City.

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SPECIAL NOTICES

Advertisements inserted under this heading at 20 cents per line; about 7 words make a line. Remittance should accompany copy. Replies forwarded if postage is furnished.

Cars for Sale

A 1909 PACKARD, demountable rims, etc. The Royal Tourist Car Co., Broadway and 62d St., New York.

A 1907 RAINIER touring car. Splendid condition. Nearly new body. Top, tires, magneto. $900. E. L. Mooney, 320 5th Ave., New York.

A CHALMERS "30" 1909 runabout, double rumble, with folding backs, lamps, gas tank, speedometer, rubber apron and extra tire. Driven only 3,500 miles. In perfect condition; factory overhauled recently. $1,150. Apply to H. H. Walker, 873 Jefferson Ave., Detroit.

ALL KINDS of cars at all kinds of prices, $150 and up. Write us or call and we can satisfy you. Western Auto Sales Co., 309-311 Michigan Ave., Chicago, Ill.

A STANLEY Steamer Touring Car (1907) in fine condition, $650; top, gas lamps, generator, good tires, extra shoe, new boiler. Thos. D. Mowlds, Bala, Pa.

A RARE OPPORTUNITY—
Great Bargain.
Locomobile, 7-passenger, good as new, up-to-date, good a car as runs, cost $5,000; will sell for $1,500, or trade for horses, carriages or most anything or sell on easy terms. 1233 Columbus Ave., Boston, Mass.

A TWENTY-PASSENGER Sight-seeing car, thirty horse; good condition; cheap for cash. High-grade car at a sacrifice. Alamann Motor Car Co., Haw River, N. C.

A THIRTY-HORSEPOWER "Rapid" truck, in first-class condition. E. T. Hurley, Watkins, N. Y.

AUTOMOBILE, rebuilt, 5-passenger, Model F Ford, $375. H. K. Miller, Philadelphia, N. Y.

AUTOMOBILES BOUGHT and sold, 20th Century Automobile Co., 1615-23 B'way, corner 49th St. 'Phone 4767 Col., New York.

AUTOMOBILES BOUGHT and sold for cash, of good standard makes. If you want to buy or sell, write Braley & Myers, 66 Berkeley St., Boston, Mass.

BIG BARGAIN, Oldsmobile 1907 palace touring car, complete with top, good running order, good tires; first check for $600. Gibbes Machinery Co., Columbia, S. C.

BUICK, Maxwell, Cadillac, Mitchell, Autocar, Reo; we buy and sell. Brooke, 86 Warren St., New York.

BUICK touring car in fine condition; best 1905 car in America; $300. C. G. Moore, 647 South Erie St., Massillon, O.

BUICK 30, 4-passenger, 4-cylinder, magneto, Prest-O-Lite, speedometer, clock, trunk, rack, extra tire, etc.; cost over $2,000; will sell for $950; '08 car, run about 7,000, in good running condition; will demonstrate any time W. C. Thompson, Shelburne Falls, Mass.

COLUMBIA LIMOUSINE, mark 47, gas car; Columbia demi-limousine, mark 47, gas car; 7-passenger Columbia, mark 47, touring car; all fully equipped; for sale cheap. New York Transportation Co., Eighth Ave. and 49th St., New York. Telephone, 8000 Columbus.

EASY PAYMENTS—Automobiles, diamonds, jewelry, watches, bungalows, plots; exchanged or sold on time; confidential. Write Le Roux, 739 McDonough St., Brooklyn, N. Y.

ELMORE 46, 1910, seven-passenger demonstrating car, fully equipped, used 1,000 miles; condition perfect. C. H. Turner, Henderson, N. C.

EXTRAORDINARY BARGAINS in late models of high-grade used automobiles. We are sure to have the car you want: See us before buying. During the past week we secured a large number of cars from certain overstocked manufacturers. As they must be sold quickly to make room for other incoming cars, and as by our spot cash methods we are enabled to secure many good cars, all standard makes at remarkably low figures, we are, in keeping with our policy "Small profits but quick sales," offering these cars at startling reductions. These cars are all thoroughly overhauled and fit for good service. Among those ready for immediate delivery are: Packard touring car, fine condition; Peerless, 7-passenger, guarantee by Peerless Company; Oldsmobile 1909 touring cars; Chalmers-Detroit 1909, equal to new; both touring and runabouts; Pullman 1909 5-passenger, handsome, powerful car; Cadillac "30," demi-tonneau; Dolson, 5-passenger touring, 40 H.P., complete equipment; Buicks in various models, cannot be told from new; Thomas taxicabs like new, sacrifice; Fords, Maxwells, Reos and many others. Send for our useful bulletin. It will save you money. Times Square Auto Co., Largest Dealers in the world. 215-217 W. 48th St., near B'way. Also Philadelphia, Chicago, St. Louis, Kansas City.

FIVE-PASSENGER touring car, fully equipped, with top; newly painted; great bargain. Address E. C. Morrill, 13 Cabot St., Portsmouth, N. H.

FIVE-SEATED passenger White Steamer, in first-class condition; price $750. Address W. F. B., 201 Security Bldg., Galveston, Texas.

FOR SALE or exchange for light five-passenger car, my 60-H.P. Thomas Flyer, in first-class condition. J. T. Mourant, Wanaque, N. J.

FOR SALE OR EXCHANGE—Maxwell touring car, $700; Rambler touring, $600; Pope-Toledo touring, $300. J. Russell Curry, Ridgway, Pa.

FOR SALE—At a bargain, White touring car, late model, excellent order; fully equipped. Geo. A. Kilborn, 107 Dwight St., New Haven, Conn.

FOR SALE—A White Steamer, seats three; good condition; just overhauled; good tires; only $200. Nat E. Donaldson, 142 Pearl St., Painesville, Ohio.

FOR SALE—White steamer touring car in first-class condition; repainted and new top put on 30 days ago; new tires, windshield and guarantee car as represented; only reason for selling have taken the agency for line of cars and have no use for it; $650 will buy it. J. F. Sechrist, 147 E. State st., Trenton, N. J.

FRANKLIN MODEL "D" touring car, just finished, not yet out of Syracuse shop; immediate delivery; price $2,400, including extras, which cost $197. Address T. W. Williams, 25 Warren St., New York.

HOLSMAN, Model 10; top, lamp and extras; runs good as new. What will you give? Address J. H. W., care The Automobile.

HOLSMAN, No. 10, with top, lamps and extras; cost over $900; runs well as ever; wish to exchange for Stanley Steamer in as good condition. Address Box 125, care The Automobile.

HOLSMAN SURREY—4-cylinder, 26-H.P. high wheel 1910 model four-passenger. Top, storm curtains and lamps complete. Used as demonstrator; A1 condition. Cost $1,125; $500 takes it. Must sell. H. P. Finks, Ft. Smith, Ark.

I HAVE A TOURING CAR and also a runabout, both 1908 models, which I wish to dispose of and will sacrifice for immediate sale. Full description upon request. These cars are in elegant condition and are offered at a real bargain. C. Franz, 615 West 115th St., New York.

I WILL SELL my light touring car, 24 H. P. gasoline; seats five; cost $1,250; will take $500; newly painted and overhauled; would take steamer or running gear in part payment. C. A., Box 53, Greenwich Village, Mass.

KNOX four-cylinder, 7-passenger touring car, selective type transmission, magneto and all equipment; first-class condition; leaving city; first check for $550 takes car. Address Box 180, care The Automobile.

LIMOUSINE AUTOMOBILE, 7-passenger, special build; Continental engine, 45 H. P.; in excellent condition; fine livery car. Price and terms reasonable. Apply Owner, Room 804, 234 La Salle St., Chicago, Ill.

LOZIER 1907 car, perfect order, seats seven; used privately; had good care; price $1,000; quarter its value; cost $6,500. Stable, 254 West 54th St., New York.

MARTINI seven-passenger touring; cost $8,400 to import; has traveled 11,000 miles; freshly overhauled; no dealers. Geo. Loomis, Long Island Automobile Club, Brooklyn, N. Y.

MAXWELL 4-cylinder touring, late model, fully equipped; bargain, $800. Chas. Jacobs, 5 West 22d St., New York.

MODEL E, 24 H. P. Corbin touring car, with top and speedometer; all in good condition; $650. A. S. Lee, 52 Richmond St., Providence, R. I.

MY MODEL H FRANKLIN Surrey; six-cylinder; nearly new. Address C. E. Fletcher, 3320 Main St., Kansas City, Mo.

NOW READY—Just what you have been waiting for—the nobbiest little pleasure and business runabout and roadster on the market for only $500 and up; weighs 1200 lbs.; solid cushion or pneumatic tires; up-to-date in every particular; speedy and powerful. A practical, simple automobile that will go anywhere at lowest cost of upkeep. Send for illustrated circular of this classy little thoroughbred and our special introductory offer before you buy any car. Kenmore Mfg. Co., 445 Gaff Bldg., Chicago, Ill.

ONE HALF-TON TRUCK, $200, 16 H.P., good order, worth $500; must sell at once. Box 173, Dennis, Mass.

ONE MODEL "R" FORD for sale, complete with lamps, top and good tires. Address "Ford," care The Automobile.

ONE FIVE-PASSENGER six-cylinder Ford touring car, fully equipped. One two-cylinder model F, 1909 Buick touring car, fully equipped. One National electric Stanhope, new batteries, new motor, new tires. All of the above have been thoroughly overhauled and are in first-class shape. For particulars address Holabird & Neal, Decatur, Ill.

OVERLAND 1910; owner cannot take delivery and will sell for immediate delivery at concession; can deliver any model. Room 1114, 99 Cedar St., New York City.

PACKARD 1909 30, $3,200; Packard 1909 30 landaulet $3,700; Packard close-coupled 1909, $3,200; Packard 1908 T. C., $2,200; Packard 1907, $1,600; Packard 1909, $1,100; Peerless 1909 T. C., $3,000; 1908, $2,200; 1907 45-h.p. Peerless, 7-passenger, $1,400; Pierce-Arrow 1907 landaulet, $1,400; Stevens-Duryea 1909, Model Y, $2,600. All of these cars have been thoroughly overhauled and painted and guaranteed to be in perfect condition. If you are in the market to buy a good used car it would pay you to see our line before purchasing elsewhere. Joseph S. Donovan Co., 171 Huntington Ave., Boston, Mass.

PANHARD touring car, 35-50 h.p.; full extension leather top; in perfect condition; cost $10,000, sell for $2,500; a great bargain; owner leaving city. Hand, 1270 Broadway, New York.

REAL AUTOMOBILE VALUES—As selling prices depend upon expenses, we are in a position to offer the greatest values in New York; two blocks from Broadway means $30,000 annually saved in rent. Another strong feature is that we sell direct for owners, charging them 5 per cent. commission. This saves you the liberal profit demanded by dealers. Over 250 slightly used automobiles to select from. Prices $150 to $4,000. Nearly every make represented in the great stock here. Call or send for weekly bargain list. Manhattan Storage Co., 334-340 West 44th St., New York City.

REBUILT THOMAS FLYERS, '08 and '09, four and six-cylinder models, factory overhauled and refinished, at attractive prices. A far better proposition than a new cheap car. Also '07 Thomas, '09 Stoddard-Dayton roadster, '07 Mitchell runabout, '06 Pierce-Arrow with delivery body. Retail Department, E. R. Thomas Motor Co., 1200 Niagara St., Buffalo, N. Y.

RENAULT 2-cylinder, double landaulet body fully equipped, newly upholstered, glass front, fine condition; sell reasonable. London Realty, 1265 Broadway, New York.

RUNABOUT, fully overhauled; seats two or four; rare bargain, $150; one four-cyl. Ford runabout, $250. Garage, 60th St. and New Utrecht Ave., Brooklyn, N. Y.

RUNABOUTS and small touring cars our specialty, from $250 upwards. Cars guaranteed, demonstrated and delivered free. C. & G., Auto Co., 62 West 43d St., New York.

SEVEN-PASSENGER touring car for sale; perfect condition; fully equipped; ready for tour; $2,000. 3432 North 17th St., Philadelphia, Pa.

SEVEN-PASSENGER 40-H.P. 'bus, handsome, cheap; also motor wagon, electric Stanhope, Empire roadster, high wheel cars, etc., $100 up. Auto & Accessories Mfg. Co., 1416 Madison Ave., Baltimore, Md.

STANLEY STEAMER, '09, light touring car; fine condition; bargain for cash. 382 31st St., Milwaukee, Wis.

THOMAS FLYER, 40 H. P., for sale. Pittsburgh Auto Repair Co., Grant Ave. and Boquet St., N. S., Pittsburgh, Pa.

TOLEDO STEAM RUNABOUT, in A-1 condition; will exchange for Pierce four-cylinder motorcycle in good condition. E. B. Fisher, Greensburg, Pa.

TWO 16-passenger sight-seeing cars, in fine condition. W. A. H., 21 Stanley Terrace, Grand Rapids, Mich.

TWO new modern thirty-passenger electric sightseeing cars with terraced seats and canopy top. Low price to quick buyer. Address "Electri," care The Automobile.

WAVERLY ELECTRIC, new batteries, new tires and in good running condition; a bargain for $350. Address Farnum, 11 Kay St., Newport, R. I.

WAVERLY Electric Coupe, run two years; recently overhauled; new batteries; tires in good condition; original cost $2,100. Will sell for $650 cash. G. S. Elton, 121 So. 7th St., Terre Haute, Ind.

WE HAVE some very attractive bargains in used cars; Winton touring car, 35-H.P., cost $3,000, for $750; Buick touring car, 22-H.P., cost $1,350, for $700; Baker electric Victoria, 1908, cost $1,850, for $1,000; Buick roadster, 1909, cost $1,100, for $700. Auburn Automobile Co., 54 Water St., Auburn, N. Y.

2 ATLAS '08 Landaulets, with extension fronts, in good running order; thoroughly overhauled this spring; will sell for $725 each. Geo. A. Gray, 338 Broadway, Somerville, Mass.

12-PASSENGER sight-seeing car; just overhauled and in a No. 1 condition. For information address V. A. Heise, General Delivery, Freeport, Ill.

24-H. P. STODDARD-DAYTON touring car, with top, $650. A. S. Lee, 52 Richmond St., Providence, R. I.

$400 DISCOUNT on a new 1910 Model D Franklin automobile; has top, seat covers, shoe irons, trunk rack, etc.; guaranteed absolutely new and perfect in every way. Davis Automobile Co., Inc., 7 Dorrance St., Providence, R. I.

$200 BUYS single-cylinder Cadillac, in perfect condition, tools, side lights, etc. F. G. Fletcher, 17 Fletcher Ave., Lexington, Mass.

1904 WHITE steam touring car; in excellent condition; will sell cheap or trade for larger car and give difference. Geo. A. Bell, Wheelersburg, O.

1906 WHITE STEAMER; a good steamer, in good condition, top, glass front, speedometer, and all equipments; tires nearly new. Emerich Thern, 10 Thacher St., Boston, Mass.

1907 RAMBLER, Model 14, 5-passenger, 4-cylinder, in good condition; new top, glass front, tires new; a bargain at $450. A. McIntosh, 119 Columbia St., Quincy, Mass.

1909 THOMAS FLYER, 4-60, 7-passenger, 7,900 miles; perfect shape; cost $4,800. 1910 Columbus electric, 4-passenger coupe, brand new, never run; cost $2,400. 1910 Palmer Singer, 6-60, 5-passenger, 2,100 miles, perfect shape; cost $4,100. Highest cash offer takes either. A. L. Sheridan, Lafayette, Ind.

1910 CAMERON Model 11, with full equipment; new car; bargain if taken at once. P. B. Ryan, Elkton, S. D.

Cars Wanted

AM NOW sales manager for large state agency for automobiles at Dallas, Tex. Have been in the sales department of two largest state houses in Texas for three years. Know nearly all the state sub-agents and am very familiar with the retail trade at Dallas. Two years was connected with large Eastern factory before coming to Texas. Want to represent some high-class car for this territory for some manufacturer wanting to put his car in Texas. Address F. A. W., care The Automobile.

A SECOND-HAND RUNABOUT wanted in part payment for 8-room bungalow. A. W. Pearsall, Baldwin, L. I.

CADILLAC runabout wanted; must be in first-class condition and recent make; state lowest price for spot cash. Address Williams Bros., 215 Union St., Lynn, Mass.

I HAVE $1,000 invested in real estate, pays me 12 per cent., to exchange for auto. A. T. Gibson, 35 Court St., Boston, Mass.

I HAVE good paying real estate in Newark and suburbs; will exchange for good make automobiles not older than 1907. Particulars, Post Office Box 441, Newark, N. J.

I WANT TO BUY a few good second-hand automobiles; will pay cash. 1233 Columbus Ave., Roxbury Crossing, Boston, Mass.

I WILL EXCHANGE SOME STOCK in a large manufacturing company for a new or slightly used automobile worth about $2,000. This stock is registered and is estimated to pay 30 per cent. dividends the next year based on past earnings of the company; or will exchange first mortgage bonds, 6 per cent., in a large coal and coke company instead of stocks. Address "X 79," care The Automobile.

MAXWELL 1908-9 runabout, one needing overhauling. Box 137, Mille Roches, Ont., Can.

SECOND-HAND AUTOMOBILE wanted; will exchange $1,000 interest in prosperous wholesale business on State St. Geo. G. Power, 252 Dudley St., Roxbury, Mass.

WANTED—Agency for a standard make automobile and auto truck. Pittsburgh Auto Repair Co., Grant Ave. and Boquet St., N. S., Pittsburgh, Pa.

WILL EXCHANGE a $650 player-piano for a runabout or automobile. Address Samuel L. Curtis, 119 East 126th St., New York.

WILL EXCHANGE new stock musical goods and records. Want light 4-cylinder, 4-passenger car, Fort T preferred. P. O. Box 361, Greenville, S. C.

WANTED to trade gilt-edge stock for good automobile. Chas. Sparks, New Haven, Conn.

Parts and Accessories

FOR SALE

A $25 SIX-VOLT storage battery, $7; $15 Royal, $5; magneto, perfect, $5; Apple dynamo, 1-3d cost; boat switchboard; $100 high-tension magneto, $30. Eagle, 269 West 17th St., New York City.

ARTILLERY WHEELS with front and rear hubs, and quick detachable rims; sizes 32 x 3 and 3½, 34 x 3 and 3½, $20 per set of 4; springs rear, three-quarter and full elliptic, French head, $6 pair; half-elliptic front, $4 pair; 10 carbide generators, Solar pattern, large size, $3 each. J. Bristow, 421 East Michigan St., Indianapolis, Ind.

AUTO PATTERNS and drawings complete for 4¼-in. x 4¾-in. cylinder, water-cooled vertical motor at reasonable price. W. J. Nobach Pattern Works, 522 Jackson Blvd., Chicago.

BEAUTIFUL decorated limousine body of an imported $10,000 car for sale; price, $400. Apply Leikens, 718 5th Ave., New York.

BUICK MODEL NO. 10 OWNERS—If you would have better control, write for circular descriptive of the F.-B. Automatic Clutch Releaser. Engine brake and low speed pedals throw out the high. The F.-B. Company, 1211 Lady St., Columbia, S. C.

CHEAP—Auto storage battery. H. Hill, 452 E. 46th St., Chicago, Ill.

DE DION 8-cylinder, 50 H.P. chassis for sale, on account of too late delivery; price $6,000; will make 10% discount; also torpedo body partly completed. Address "Dale & Co.," care The Automobile.

DELIVERY, Sixteen horsepower, rebuilt, guaranteed, selective sliding gear transmission, Swinehart solid 33x4¼, side chain drive, also Splitdorf 4-cyl. coil master vibrator, like new, $20; two-cyl. vertical motor, $25, not guaranteed but runs; 4-cycle. W. K. Auto Co., 721 Liberty St., Allentown, Pa.

DO YOU WANT to remodel the appearance of your car? State model and proposed change. Ask for catalogue S of seats, bodies, fenders, etc. A. R. Co., 1307 Wabash Ave., Chicago, Ill.

DRAGON REPAIR PARTS—We manufacture and keep on hand all repair parts for Dragon cars. We make a specialty of repairing this machine. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

FOR SALE—Bodies made for Rider-Lewis 1910 cars; trimmed; some painted. R. J. Irvin Mfg. Co., Indianapolis, Ind.

FOR SALE OR TRADE—Peerless engine, tank and shredder; will exchange for five-passenger automobile. C. F. Cunningham, Heyworth, Ill.

FOR SALE—No. 10 Lingle power hammer, used less than 10 days, good as new; will sell cheap. If interested, send for complete information. Milton Mfg. Co., Milton, Pa.

FOR SALE—25 H. P. engine and boiler on skids and Cadillac automobile; both in good order, or will exchange for cows or 4-passenger automobile. A. D. Sackett, New Lebanon, N. Y.

FORD MODEL "T" OWNERS—Secure our electric light outfit for your car; something entirely new. Write to-day. Magneto Lighting Co., Lock Box 86, Passaic, N. J.

FORD T OWNERS get our catalogue of specialties for your car. It means $ $ $ $ to you. Oil gauges, electric light outfits, elevated timer attachments. Send dealer's name. Auto Parts Co., Providence, R. I.

LARGE BODY for automobile wagon, with top, for sale. 1612 Carroll Ave., Chicago, Ill.

NEW AERONAUTIC ENGINE, 100 lbs., $250; 25 to 30 h. p. T. Weinberg, 118 Alfred St., Detroit, Mich.

ONE Atwood generator, one set Baldwin shock absorbers, one large horn, one auto clock. J. L. Benedict, Lehmasters, Pa.

PACKARD "30," 4-passenger, close coupled body only, '09 model, refinished and in excellent condition, with irons for top; will fit '08, '09 or '10 Packard "30" chassis. Dimensions, 103⅝x33¾ inches. Chicago Motor Car Co., 24th and Michigan Ave., Chicago, Ill.

RADIATORS, hoods, mudguards, metal dishes, gasoline and water tanks. If building or remodeling a car, it will pay you to write us, as we lead in this line. Auto Sheet Metal Works, 2230 Michigan Ave., Chicago, Ill.

RUBBER IS GOING UP.
It pays to have tires repaired if done by a responsible house and guaranteed. Express goods; we estimate; you O. K. We trade in new and rebuilt tires. Mail order our specialty.
Colonial Rubber Works,
2436-38 Michigan Ave., Chicago.

SOLD AT AUCTION—Monarch Auto Co. We bought the patterns, drawings and parts. 32x3 wheels, with single tube, $25; 28x3 new wheels, per set, $12; 28x2½ single tube wheels, $8; 36x4 wheels, $20; 28x2 Dunlop '05 casings, $; hood radiators, 18 inches wide, 17 inches high, $22; others up to $25; 27½-inch folding hoods, $3.50; locking steering gears, $10; new selective sliding gear trans., with levers, $90; second-hand trans., $35; planetary, $12; 1-cyl. air-cooled motor., $30; 2-cyl. opposed 8 h.p., $35; 10-h.p., $60; 4x4 Ford water-cooled motor, $55; 4½x4, $80; 4½x5 and 5x4, air or water cooled, $90; 3-cyl. air-cooled, aluminum case, $95; 4-cyl., $105; 4-cyl. Marion, $90; 4-cyl. Winton C, $130; 4½x5 Rutenber, $175; 1-cyl. Olds, $40; pressed steel frames, $15; fenders, with skirts, $10 per set; 1¾-inch full elliptic springs, $2.75; 5-pass. body, $70; runabout body, $60; 18-inch steering wheels, $3.50; chain drive axle, 30-tooth sprocket, $25; front axle, $15; solid 1⅝-inch ball bearing axles, $30 per set. Before buying, write us for catalogue and special prices. Auto Parts Co., 517 W. Jackson Blvd., Chicago.

SEND TEN CENTS for 208-page Catalogue of boat and automobile supplies. Lowest prices, and immediate shipment guaranteed. Truscott Boat & Auto Supply Co., St. Joseph, Michigan.

SPEEDOMETER (Jones) for sale cheap; perfect condition; used only few weeks. Lehman, 201 West St., New York.

STEPNEY WHEEL, fits 36 x 4½ or 36 x 4 rim, with inflated Goodrich tire; price $30. Address Box 111, care The Automobile.

TOPS—Until further notice, runabout tops, $20; touring car tops, $35. C. G., Meyer & Son, Tiffin, Ohio.

VERY CHEAP, one 5 x 5 four-cylinder, four-cycle motor, good condition. Ask us some questions. Ellis Garage, Macon, Ga.

18-INCH LATHE, Chuck, Steady rest, complete; 16-in. Shaper; 4-H.P. gas engine; 2-cyl. engine; 1 single-cyl. engine, body and running gear. T. W. G., Box 121, Meyersdale, Pa.

40-HORSEPOWER MODEL M Oldsmobile engine with radiator; good condition; slightly used. The W. W. Garage & Machine Co., 123 No. Mechanic St., Cumberland, Md.

$17.50 —FUR-LINED OVERCOATS—We have secured the overstock of one of the largest manufacturing concerns in the East. It consists of several hundred men's and women's fur-lined coats, marmot mink lined, kersey broadcloth, Persian lamb collar, velvet pockets. We paid them cash for these coats, which was what they needed, and we are able to sell them for nearly 25% less than we could manufacture them ourselves. All sizes. Price $17.50 each. No discount on quantities, but expressage paid on orders of 10 or more. In season these coats will bring $40. Will send one for inspection upon receipt of expressage. Business rating required on all orders unaccompanied by cash. Order immediately as quantity is limited and orders will be filed as received. Importers Fur Mfg. Co., 14 West 22d St., New York City.

Parts and Accessories

WANTED

WANTED—Motor, controller and set of wire wheels for 30-in. x 3-in. clincher tires for Baker Electric Stanhope. Address A. L. Chamberlin, 1040 E. 6th St., Des Moines, Ia.

Situations Wanted

A MOTOR CAR COST ACCOUNTANT, thoroughly familiar with all details of most approved methods, day work, piece work and premium work; ten years' experience; now in similar capacity with large auto maker; desires change for excellent reasons. Address "Motor Car Cost Accountant," care The Automobile.

A PRACTICAL experienced garage manager, a magnet for business, wants an offer. Address Box 117, care The Automobile.

A YOUNG MAN of good family desires position of driver with private party planning extended European tour; three years' experience; references exchanged. Address Box 121, care The Automobile.

CHAUFFEUR, 29, married; does not smoke or drink; best reference. J. V. B., Dunraven, Delaware County, N. Y.

CHAUFFEUR, experienced, repairing, reference, desires position after 4 daily. "B. L.," care The Automobile.

CHAUFFEUR, experienced driver, makes own repairs; wages $15; best references. Address Box 116, care The Automobile.

CHAUFFEUR (24) careful, reliable, wants position on first-class taxicab or private car. Queen, 400 East 82d St., New York.

CHAUFFEUR, honest and sober; best of reference; two years' experience. Harry Aronson, 631 Jefferson Pl., New York City.

CHAUFFEUR wishes position city or country; private family; wages moderate; references. C. H. Irving, 114 West 135th St., New York.

CHAUFFEUR, young man, desires position; does repairing, automobile or boat; strictly temperate. Glenn Buck, 712 North Aurora, Ithaca, N. Y.

CHAUFFEUR, colored, mechanic; careful driver; private family; willing, sober; city or country; references. W. Evans, 316 West 119th St., New York.

CHAUFFEUR, expert machinist, careful driver, desires position; city or country; unquestionable references. P. J. McGarry, 201 West 77th St., New York.

CHAUFFEUR, thoroughly competent; can do own repairing; sober and careful driver; references from last employer. Address Box 101, care The Automobile.

CHAUFFEUR, single (24); mechanic, careful driver; city, country; temperate; references. "J. J. P.," care The Automobile.

CHAUFFEUR, three years' experience on Ford cars; careful driver. William Shapiro, 22 East 118th St., New York.

ENGLISH engineer wants to form connection with first-class automobile concern in any responsible capacity. Understands automobiles mechanically and theoretically; expert demonstrator and salesman; understands production and can handle men; splendid road and track experience. Ten years practical European experience with Daimler, DeDion, Bouton, S. F. Edge, Napier, Martini Motor Car Emporium. Introduced Bianchi in England, selling sixty the first year. Was sole representative of Rapid for Great Britain and Colonies. Designer of Stella car, Geneva, selling entire output outside Switzerland. Would be particularly valuable to a concern contemplating or carrying on export trade, but am susceptible to American methods; salary reasonable. Box 136, care The Automobile.

SITUATION WANTED by colored man; 5 years' experience; good references. Address Lawrence Laird, 4102 Lake Ave., Chicago, Ill.

THOROUGHLY PRACTICAL mechanics and drivers furnished the auto trade; thorough practical experience our method. Automobile School of Mechanics, 175-7 West Mitchell St., Atlanta, Ga.

Help Wanted

AGENTS WANTED—

Selling agents in small cities, for new type low-priced automobile delivery wagon; no rivals; beyond competition. "Missourian," 222 Cardinal St., St. Louis, Mo.

MANAGER WANTED—An old and well-established automobile concern wants an experienced automobile salesman as branch manager; good proposition to a man between 30 and 40, who is a good executive and can show a successful selling record; state age, education, experience and salary expected. Address Box 185, care The Automobile.

SALESMEN wanted to sell our goods; experienced men desired. Write for particulars and give reference. The Hickok Mfg. Co., Rochester, N. Y.

WANTED—Two good mechanical draughtsmen familiar with up-to-date automobile practice; men who have handled cars preferred. Address F. R. P., care The Automobile.

Repairing

ALUMINUM, cast iron, steel welded and amalgamated to perfection; nothing too difficult; no soldering, patching or warping; gear cases and cylinders a specialty; only practical process; work guaranteed. "Futterman's Welding System," 798 10th Ave., N. Y.

ALUMINUM and cast iron welding—You will never know how well we can weld broken cylinders or crankcases, or how reasonable our prices are, until you try us; start now; perpetual guarantee. The J. H. Deppeler Co., Inc., 819 Jersey Ave., Jersey City, N. J. Telephone, 2430 Jersey City.

AUTOMOBILE PARTS reclaimed—Broken cylinders, crank cases, transmissions repaired by the oxy-acetylene welding process; all metal frames lengthened and welded without taking down; we guarantee our work. Ohio Welding & Mfg. Co., 2121 E. 2d St., S. E., Cleveland, O.

GEORGE LOBER, manufacturer spun goods, auto lamps repaired, new parts made, radiators overhauled and general brass work. 3123 Monroe St., Toledo, O.

IGNITION REPAIRING—Magneto and coils repaired by experts who know how. The B. H. Specialty Co., Massillon, O.

SEND US BROKEN CYLINDERS, crankcases, etc., to be repaired by autogenous welding. Quicker and much cheaper than ordering replacement parts. No charge unless weld is successful. Estimates and references given. Remember we repair any broken metal parts without solder, pressure or brazing. Try us. Waterbury Welding Company, Waterbury, Conn.

TIRES REPAIRED—Automobile owners, do you want your tires repaired or re-covered by the people who know how? Give us a trial and be convinced. Inner tubes vulcanized at short notice. Jungkind & Vogler, 118 Chambers St., New York City. Telephone, 3386 Cortlandt.

Insurance

TIRE, THEFT, liability, collision, accident, property damage and transportation, fully covered; lowest rate. Colman Company, 165 Broadway, New York. 'Phone, Cortlandt 2409.

Auto Schools

AUTOMOBILE INSTRUCTION, individual road work and small group classes. Day and evening. Arrangements for out-of-town men. Booklet on request. West Side Y. M. C. A. Automobile School, 310 West 57th St., New York City. Tel. 3800 Columbus.

AUTOMOBILE DRIVING LESSONS, $1.00 per lesson, day or evenings; evening 7 to 10 P. M., on four-cylinder cars. Jamaica Plain Auto School, Cor. Weld Park and Arborway, near Centre St., Jamaica Plain, Mass.

THE STEWART Automobile Academy, 231 West 54th St., New York; best equipped motoring school in city; up-to-date motors, chassis and ignition systems; educated, practical instructors; for owners, prospective owners, women; separate courses for chauffeurs; modern cars for road work. Telephone, 5409 Columbus.

For Sale or For Rent

AUTOMOBILE GARAGE, machine shop and vulcanizing plant for sale. The best paying proposition in the South. Rent service alone averages $75.00 per day. Failing health the only reason for selling. It will pay you to investigate this at once. The season is just opening, and it is the opportunity of a lifetime. Address "Automobile Garage," care The Automobile.

FOR SALE—One-half or entire interest in only garage in Indiana town of 7,000; large patronage; good reason for selling. Address Box 7, care The Automobile.

FREE BUILDING AND SITE.

Stevens Point, Wisconsin, offers the large Wisconsin Central Railway car, machine and paint shops for

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P. O. Box 1084. Stevens Point, Wis.

FOR SALE—One-half interest in a fully equipped machine shop, with garage attached, in Newport, R. I. Address P. O. Box 264.